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MECHANICAL ENGINEERING DEPARTM

ELECTRIC RAILWAY JOURNAL

DAILY EDITION DAILY EDITION

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Chicago—October 8, 1912—New York

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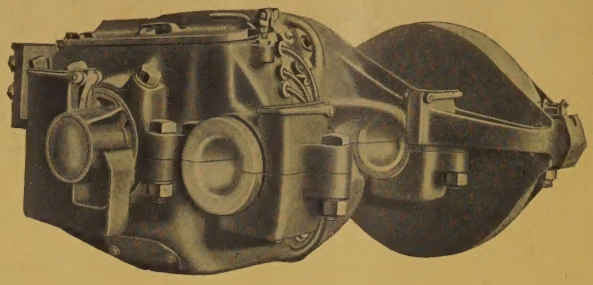

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Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Electric Railway Association and Its Affiliated Associations

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CHICAGO, TUESDAY, OCTOBER 8, 1912.

PROGRAM FOR TO-DAY

CONVENTION MEETINGS

9:30 a.m. Session of Accountants' Association, Orange Room, Saddle and Sirloin Club.

9:30 a.m. Joint Session of Engineering and Transportation & Traffic Associations, Brown Room, Saddle and Sirloin Club.

9:30 a.m. Session of Claim Agents' Association, Green Room, Saddle and Sirloin Club.

2:00 p.m. Opening Meeting of American Association, Blue Room, Saddle & Sirloin Club.

ENTERTAINMENT

3:30 p.m. Ladies' Afternoon, Vaudeville and Recital by Eminent Artists, Ballroom, Blackstone Hotel.

9:00 p.m. Card Party for Ladies and Gentlemen, Gold Room, Congress Hotel.

11:00 p.m. Informal Dancing, Gold Room, Congress Hotel.

The Opening Day

The first day of the convention is regarded ordinarily as a time of preparation and organization, but this year the plan of arrangement of the programs has brought some excellent features before the members in the opening sessions. All four of the allied associations held their opening sessions yesterday afternoon with a good attendance and made an excellent beginning on the work of the convention. A promising beginning is a great help toward the successful completion of the program, as it is not easy to calculate the precise amount of time that will be required for the different papers and features, and if a little leeway can be secured it is certain to be found useful before the programs set for all of the days are completed. With favorable weather conditions on the first day, a large registration and programs as full as those which have been prepared by the various associations for this year, there is every reason to expect that the records of previous years will be excelled in the 1912 convention. The manufacturers have done their part by arranging the largest and finest exhibit in the history of the association. Now it is the duty of the railway men in attendance to make the most of the opportunity afforded them by the activities of the manufacturers and to make the proceedings at the various sessions a record of permanent value to the industry.

The Codes of Rules

The most important development in committee work affecting rules for the operation of cars this year is the reconciliation of some differences in the city and interurban codes and the tentative arrangement for conferences with representatives of the American Railway Association in regard to cases in which the steam and interurban codes can be brought more nearly together when this is necessary. The announced purpose of conferences with the steam railway association is to consider changes in the rules applicable to both interurban and steam roads. We notice that a number of companies have made changes in the codes of rules so as to adapt the requirements more closely to local conditions existing on individual properties. No doubt the great majority of such changes are very slight, but it would be well if the committee could ascertain whether any are material; in other words, where there are departures from the standard codes the committee should know the reasons, for they may be of sufficient importance to warrant consideration by the entire association. The association standard codes should be subject to continual revision and, either through committee work or annual consideration by the association, should be kept in a state where they represent the best practices known anywhere in the industry. Then, if individual companies, for reasons either of economy or because of other local conditions, do not revise their codes periodically so as to be in conformity with the standards recommended by the association, the responsibility rests with them. The duty of the association, however, is to formulate the best codes which experience recommends, and this can be done only by painstaking work by committees each year, and a careful consideration and co-operation in the work by member companies.

Saving Time at the Exhibits

Experienced attendants at conventions have learned nothing more valuable in connection with making themselves at home at the exhibits than how to economize time in going over displays. The secret of it is very simple and homely, but, like many other practical methods of working, it is far from being practised by everyone. Important requisites are a full supply of business cards, some of which have the delegate's local hotel address written upon the back, a notebook, preferably of the loose-leaf variety, and a keen sense of essential points to be covered. It may seem trite to emphasize the wisdom of making a list of particular exhibits to be visited before leaving for home or to point out the time economy of visiting booths so far as possible in the "off-peak" hours when the apparatus details are more accessible and when

waits for someone to explain interesting features will be minimized. No little time is lost by the failure to do these things. Much is gained by making a casual preliminary survey of an exhibit from the aisle, followed by an inquiry as to what new equipment or advances over former designs are being shown. One does not visit displays of apparatus at conventions to see long-established designs of equipment so much as to become familiar with the latest forward steps in the products shown. In connection with the examination of these new details as worked out in wood and metal a small pocket flashlight is one of the best time-savers available to the busy delegate.

The exhibitor can do more to save the time of his visitors and himself than is often realized by looking sharply after such matters as placing light equipment at a reasonable height above the floor, providing first-class illumination, placing his publications where they can be obtained with the least possible effort by genuinely interested visitors, seeing to it that the exhibit is not so crowded with apparatus that moving about is difficult even when the display is not occupied by large numbers of visitors, and, above all, by labeling new and important equipment with the essential points which will attract attention and answer the casual inquiries of passers-by. While circumstances alter cases in this last practice, it is difficult to exaggerate the increase in interest which a few carefully prepared placards arouse at an exhibit containing a number of new features which ought not to be overlooked by the delegate who appreciates that a convention trip is to the conscientious visitor a sort of post-graduate course.

Power Distribution Subjects

The report of the committee on power distribution for this year is rich in a large amount of constructive work in matters relating to line design, construction and material. The specifications for overhead crossings of trolley and contact wires over railway tracks are considered by the committee chiefly as suggestive, but they have been worked out with such care that they deserve that extended discussion and criticism which will make it possible to put them in more permanent form. Particular attention may be called to the conditions for which catenary construction is recommended and to the recommendation for galvanizing all structural steel and giving it a protective coating.

The second specification of the report covers overhead crossings of foreign wires with electric railway wires. The constant increase in transmission potentials and the public feeling that overhead transmission wires should be eliminated are two strong reasons why electric railways should be prepared to use for this purpose the best construction that they can afford. The third specification is composed of the revised copper tables, based upon the new value for the standard resistivity of annealed copper, as adopted by the Bureau of Standards and the American Institute of Electrical Engineers. This change is a good indication of the endeavor of the American Electric Railway Engineering Association to keep abreast of technical developments. Other specifications which are included in the committee's report for this year are those for galvanizing on iron and steel, for tile ducts, copper armor for trolley wire, composition armor for trolley wire, solder, cross-arm braces, galvanized eye-bolts, hard-pine cross-arms, trolley ears, bare galvanized iron conductor wire and suspension and guy wire and single conductor weatherproof triple-braided wire and cable. There is also an appendix which contains sixteen electric wire and cable definitions, as suggested by the United States Bureau of Standards. The committee on power distribution has also done work in discussing the joint use of poles with representatives of other public service interests, but it has requested that it be discharged from further consideration of this subject, owing to the fact that the subject of joint use of poles has already been assigned for further review to a special joint pole committeee.

The Convention Exhibits

Despite the handicap of unfamiliar surroundings—for the long pier at Atlantic City has become almost second nature—Monday morning saw most of the exhibits ready for the inspection of the delegates. It is apparent even at first glance that the advantage of Chicago as a freight center and the liberal dimensions of the Exhibit Hall have encouraged the manufacturers to exceed all previous efforts of recent years. There are so many "star" features this year that it would seem invidious to single out any for special attention. Perhaps the most conspicuous display of universal interest is that of the latest types of prepayment cars, such as the New York center-entrance double-deck and the Philadelphia near-side desgns. The New York car has been brought here through the courtesy of the New York Railways Company, which has been operating this car on Broadway, New York. These cars, together with examples of high-grade interurban rolling stock and trunk-line locomotives, are shown on an outside temporary track near the Exhibit Hall. The display of trucks includes patterns for every condition of service from the radial-axle design for obtaining longer single-truck cars in city service and for negotiating sharp curves to the massive construction required for high-speed interurban railway work. The truck exhibit is supplemented by an excellent showing of wheels and treated axles, both complete and in sections, to expose the grain of the metal. The car equipment engineer will also be gratified by the splendidly arranged motor control and air-brake layouts, which in one case include a complete testing outfit for maintenance shops. The exhibitors of these car and locomotive equipments deserve special praise for having their complex outfits in such fine shape at the very opening of the convention.

The growing importance of the signal problem is indicated by the fact that an entire section of the amphitheater has been set aside for the display of signal apparatus. While it was necessary, of course, to use miniature tracks and vehicles, all signal posts, semaphores, dispatchers' operating equipment and the like are full size. The signal equipments will be found to embrace designs for every line of service from the elaborate track-circuit systems to the simple trolley contact. Catenary line construction is almost an old story now, but the exhibits of this material for high-tension trolley lines show that experience on the pioneer lines has led to simpler, more dependable designs at reduced cost. In this connection it is interesting to add that to demonstrate his high standards one maker of line equipment is showing one of his testing machines.

The track exhibits not only include the usual tie, rail and special-work layouts but also stretches of completely ballasted tracks on which bonding and grinding machines are operated just as in every-day service. If good bonding is worth while because it saves current leakage at one end, the installation of some one of the car meters displayed is also worthy of attention as an economizer of current at the other end of the car. Those who have cars under construction or who are now designing new rolling stock might do well to provide some place and wiring room for the installation of such meters because the expense of preparing a suitable place for them may greatly exceed that of the meter itself. The flood of new prepayment and registration devices is still at its height, as is apparent from the elaborate displays of fare collection methods with full-sized car sections and complete fittings. The recording registers which print trip sheets are of special interest. Various platform paying schemes are also shown in new or bettered forms, aside from the complete prepayment cars which have been previously mentioned. Besides the main Exhibit Hall, delegates should not fail to visit Machinery Hall and the other annexes. It may suffice to say in conclusion that a close study of any one of a score or more displays should repay the expense of attending the convention, even if no other business opportunities or social benefits were sought after by the visiting delegate.

Conventionalities

Why is Al. Green all blue?

We are reliably informed that the gent who put the vent in ventilators is D. I. Cooke.

W. H. Heulings is wearing glasses this year. Otherwise he is much the same Bill, only more so.

We miss George Keegan, who is sitting on the lid in New York. Here's hoping he will be with us next year.

If the New York Central Special had gone as fast as John Bradley, it would have reached Chicago before the "Pennsy."

A. Jackson, the timetable king of New Jersey, says he is here to chaperon Martin Schreiber; but who is watching Jackson?

Intense interest was aroused among the engineers early in attendance, when at 11:37 a. m., Sunday, a most successful trial trip of the lawn-mower was run in McConnaughy's pretty front yard.

Looking over the half-skeletoned car on exhibition on the rail back of the hall, a Baltimore lady remarked that she was glad she didn't live in St. Louis if that was the kind of car they used out there!

President A. W. Brady, of the Union Traction Company of Indiana, and an unusually large delegation of heads of departments and others connected with the company will be here during the convention.

James P. Pappatheodorokoummountourgeotopoulos has a shop opposite the convention hall at No. 4213 Halsted Street. James P. admitted, upon being questioned, that the alphabet didn't owe him a cent.

Pity poor W. H. Wilkinson, for six years King of the Boardwalk and chairman of the roller chair committee! After so many years of loyal service, he finds himself demoted to the status of "card partner."

The Lone Star State is here with a big delegation made up of some forty representatives of member companies. Of this number the Stone & Webster interests have about twenty-five delegates. They are an enthusiastic crowd.

Last year the official bride and bridegroom of the convention were Mr. and Mrs. Bertram Berry. This year the honor of this important office is held by Mr. and Mrs. A. D. Kimmett. Mr. Kimmett is master mechanic of the Lackawanna & Wyoming Valley Railroad Company, Scranton, Pa.

S. K. Colby, of San Francisco, who has been in the East for a month, and says it seems like ten years, may not know much about the relative advantages of East and West, but there were three men on the Pennsylvania Special who were willing to admit that Mr. Colby knows all about auction bridge.

The Keystone Railway Club of Pennsylvania is well represented at this convention. About thirty members are on hand, and, according to present plans, a "get together" meeting will be held on Thursday with Vice-president Wheaton, of Wilkes-Barre, in the chair in case President Gould, of Reading, is absent.

Be it known that the great big musical hit of the Pennsylvania trip was the glee club led by E. T. Munger, the golden-toned songster of the Hudson & Manhattan Railroad. Under his masterly direction, the chorus sang with all the gusto and skill of "ein deutsches Gesangverein," and what it lacked in quality was made up in length, breadth and thickness.

The Illinois Traction System will be unable to send its full quota of representatives to the convention this year owing to the fact that the dates of the Illinois State Fair at Springfield are the same as those of the convention. As this 500-mile interurban road is taxed to the limit during the State Fair week, all heads of departments are required to be at their posts to insure perfect services.

Hay & Hay, traction oligarchs of Easton, Pa., slipped aboard the Pennsylvania Special at Philadelphia. W. O. Hay, general manager Northampton, Easton & Washington Traction Company, was accompanied by Mrs. Hay. The irrepressible Tom A. H. Hay bee-lined for the dining-car at once. Two hours later it was still impossible to pry him away from the fleshpots of the "Pennsy."

Dr. W. H. Tolman, director American Museum of Safety, is attending his first electric railway convention, not as a mere onlooker but as an active worker for the welfare of the industry. He will give a lantern-slide talk on accident prevention before the Claim Agents' Association on Tuesday morning. Dr. Tolman's earnest pioneering in this field is beginning to bear good results from both the humane and economic standpoints.

Thomas C. Penington, who was secretary of the American Electric Railway Association, or, as it was then known, of the American Street Railway Association, from 1895 to 1905, was a visitor at the exhibit hall on Sunday. While secretary of the association Mr. Penington was also treasurer of the Chicago City Railway, with which he was connected for thirty-three years. "Uncle Tom" found a number of old friends at the hall.

Albert Eastman, general manager Windsor, Essex & Lake Shore Railway, is here with some tall fish stories and a group of aiders and abettors as follows: W. W. Chisholm, chief engineer; Albert W. Westman, superintendent; C. P. Cooper, chief train dispatcher; J. L. Baird, auditor, and E. S. Hughes, traffic manager. It will be observed that on this line the man from the East has met the man from the West, although the two are not always as one!

For the first time in the history of the association Texas member companies are well represented. This is another evidence of what the selection of a central location will do toward bringing in members from distant points. The Texas delegation was sufficient for special train service, but so many of them came by detour routes that one was not used. Those making a circuitous trip to Chicago visited en route a number of street and interurban companies.

Regret is generally expressed that more of the officials of the Boston Elevated Railway were not able to come to Chicago. But, although this company has a smaller number of delegates this year, it is well represented in the persons of Matt C. Brush, second vice-president, and James D. Andrews, superintendent of power stations. It is anticipated that H. L. Wilson, treasurer; Russell A. Sears, general attorney, and John J. Reynolds, claim agent, will be here during the week.

W. G. Gove, J. J. Sinclair and Martin Schreiber, those eminent pianola virtuosi, astounded the population of the Pennsylvania Special observation car by digital and pedal calisthenics of the highest order. W. G.'s rendition of the barcarolle from "Tales of Hoffmann," combined with the swaying of the train, made the sentimental hearers dream they were gondoliering in Venice, while those of more prosaic cast said it brought to their minds a single-truck car of the vintage of 1890.

Just before ye scribes left home for the Big Week, Thomas K. Bell, ex-Quaker and now Floridan booster extraordinary, came in to tell us what the St. Petersburg & Gulf Railway, of which he is general manager, is doing to make St. Petersburg, Fla., famous. We were inclined to discount his tales of prosperity and the weights of the tarpon, crabs and bullhead tortoises that just plead to be caught and eaten by the happy inhabitants of St. Petersburg until Br'er Bell produced the price of a year's subscription in real cash.

SOCIAL EVENTS TO-DAY

A varied program of entertainment for the ladies has been provided for to-day, Tuesday. The festivities will begin this afternoon in the Blackstone Hotel ballroom, the curtain going up at 3:30.

This is the program, and the entertainment committee says it will appeal to the ladies for reasons with which they will be well acquainted after the performance.

1. Overture from "La Bohème" (Puccini).....Orchestra
2. Vocal Solo, "Waltz Invitation" (Owen).....Mlle. Dyris
3. Studies in Character.....Mr. John Ponic
4. Violin Solo.....Mr. Gaston Du Moulin

INTERMISSION

5. Selection from "Madam Butterfly" (Puccini)....Orchestra
6. "Kiss Waltz" (Arditi).....Mlle. Dyris
7. Clever Mystics.....Mr. Harry McEvoy

EVENING CARD PARTY

In the evening a card party to take place in the ballroom of the Congress Hotel has been arranged. In contrast to the card parties of former years, both the ladies and the gentlemen are invited to play and the committee hopes that the men will take advantage of this opportunity. Bridge whist and euchre will be the games played and handsome prizes will be awarded for both games. Separate prizes for ladies and gentlemen have been provided in duplicate, so that the choice of games rather than the prizes will determine each player's selection for the evening.

Progression will be followed in both games and all the rules will be found printed on the score cards. In order to facilitate the play and progression, opponents will record each other's scores instead of having the scores punched by members of the committee. Bonbons and light refreshments will be served during the play.

The card party will be followed by informal dancing with music by Benson's Orchestra.

CLUB PRIVILEGES

The entertainment committee expresses its thanks to the various Chicago clubs that have so kindly extended courtesies to the delegates of the various associations at the convention and assures the Chicago clubmen that the associations appreciate the privileges offered. The clubs which have opened their doors to us are the Illinois Athletic Club, the Chicago Athletic Club, the Hamilton Club, the Union League Club and the Chicago Automobile Club. These courtesies should gratify the most diverse tastes of the convention delegates.

TAXICAB SERVICE

Special rates have been obtained for the wearers of the official convention badges. A full list of the different companies and their rates for taxicab service will be found in the entertainment program.

RECEPTION OF ASSOCIATION OFFICERS

The reception to the American Electric Railway and affiliated associations was held in the Gold Room of the Congress Hotel last evening. It was the opening gun of the social side of the convention, although the Exhibit Hall had been the meeting place all day of a great many old friends.

At 9:30 o'clock the orchestra, under the leadership of Edgar Benson, began a musical program for the entertainment of the guests as they arrived. The officers of the different associations and their wives assembled in the Gold Room, and promptly at 10 o'clock the guests, who had gathered in the Elizabethan Room, were escorted to the Gold Room, where they passed down the reception line. Those having places in the line were General George H. Harries, H. K. Bennett, C. Loomis Allen, C. L. Henry, H. C. Donecker, P. S. Young, R. Morrison, Jr., E. O. Ackerman, Martin Schreiber, John Lindall, Norman Litchfield, J. Hanna, E. J. Burdick, B. F. Wood, H. A. Mullett, H. K. Bennett, George Carson, J. N. Shannahan, William H. Heulings, Jr., D. A. Hegarty, C. B. Buchanan, C. S. Hawley, A. H. Sisson, S. H. Blewett, Charles R. Ellicott, B. A. Hegeman, Jr., Howard F. Martin, Charles C. Pierce and Henry C. Evans.

Informal dancing began at 10:30 and light refreshments were served throughout the evening.

A Few of the Prizes Provided for the Card Party This Evening.

RESIGNATION OF SECRETARY LITCHFIELD

Norman Litchfield, who has been secretary for the past two years of the American Electric Railway Engineering Association, has presented his resignation to the executive committee on account of the pressure of other work which he has to perform. Mr. Litchfield is also superintendent of car equipment of the Interborough Rapid Transit Company of New York City, and as the New York Railways Company is operated under the same management, Mr. Litchfield's duties have greatly increased since he accepted the office of secretary of the association. His was an ideal selection because of his thorough knowledge of all branches of electric railway engineering, and efforts are being make by members of the association to induce him to reconsider his decision.

THE MAPLE LEAFERS

In addition to the bunch from Windsor noted elsewhere in this issue, a lot of other Canadians are circulating around at the meetings and exhibits. For some reason, Moose Jaw, Saskatchewan, is not represented. The Toronto contingent includes C. L. Wilson, assistant general manager; F. S. Livingston, traffic manager, and John Break, division superintendent, Toronto & York Radial Railway; Walter McRea, superintendent motor, truck and mechanical department; M. Power, master car builder; J. P. Smith, track superintendent; P. McCabe, foreman of air brakes; H. Pursley, division superintendent; E. Steele, division superintendent Toronto Railway. Others present are J. F. H. Wyse, member Ontario Railway Board; J. B. Griffith, superintendent interurban lines and purchasing agent Dominion Power & Transmission Company, Ltd.; C. B. King, manager London Street Railway; L. Garrett, master mechanic, and Arthur Knox, superintendent Winnipeg Electric Railway; Patrick Dubee, secretary and treasurer; H. E. Smith, comptroller; A. Gaboury, superintendent; A. S. Byrd, superintendent power plants, and D. E. Blair, superintendent rolling stock Montreal Tramway Company. Mr. Dubee is the new president of the Canadian Street Railway Association. There are other Canucks present, but they were too bashful to leave their names.

THIS YEAR'S BADGES

A departure has been made in the design of the badges this year, and the result is a happy one, as the badges are tasteful and distinctive. The distinguishing colors of the different associations which have always marked the badges are introduced this year in the body of the badges instead of in a ribbon.

For those who do not know the significance of the two forms of badges used an explanation will be helpful. A square badge is used by the delegates of the member companies, guests of the American Electric Railway Association, ladies who accompany delegates of member companies and individual members of the association who have not been assigned to the American Association or any one of the affiliated associations.

The other badge is in the form of a pentagon. This badge is issued to representatives of manufacturers who are members of the Manufacturers' Association, to ladies accompanying these members and to guests of the Manufacturers' Association.

The colors of the square badges distinguish the members of the different associations as follows: brown corners, Engineering Association; mandarin corners, Accountants' Association; gray corners, Transportation & Traffic Association; green corners, Claim Agents' Association; marine-blue corners, American Association; light-blue corners, American Association, guest; white corners, American Association, lady; red corners, American Association, individual members unassigned.

The five-sided badges are issued in three colors as follows: marine-blue corners, Manufacturers' Association; light-blue corners, Manufacturers' Association, guest; white corners, Manufacturers' Association, lady. Each of these badges has a red cinquefoil center.

TRAIN POOL WINNERS

In the train pool organized by E. B. Smith on the run of the Pennsylvania Special seven guessers came equally close to naming the exact minute of the train's arrival at Englewood—8:28 a. m. Each of these drew down $9 as a result of his faith in the P. R. R. being on time: Messrs. Paxton, Pierce, Cotesworth, Griffith, Munoz, Kountz and Mulholland.

ABSENCE OF PRESIDENT M'CARTER

Great regret is being expressed in all quarters at the enforced absence from the convention of President Thomas N. McCarter of the American Electric Railway Association, and the sympathy which is being expressed for him in the illness which has compelled him to remain away is general. His many friends will be glad to hear, however, that Mr. McCarter is rapidly recovering from the slight attack of typhoid fever with which he has been suffering during the past five weeks.

It is needless to say to those who know Mr. McCarter's energy and interest in the association that his absence from the annual convention has been as serious a disappointment to him as it has been and will be to the delegates now assembled in Chicago. From his home at Rumson, N. J., near Seabright, he sends greetings to the association and best wishes for a most successful convention. These greetings are being carried by J. J. Burleigh, vice-president of the Public Service Corporation; Secretary E. W. Hine and the other officials of the company who are its representatives at the convention.

It is believed that Mr. McCarter acquired typhoid fever while spending a part of the summer cruising on his yacht, but it is rarely possible, in cases of this kind, to know precisely where the germ is encountered, and that is true in this instance. Since the first week of September Mr. McCarter has been confined to his home and he has not yet ventured to go to his office in Newark. He expects to be able to visit that city, however, on Oct. 11, to be present at a rate hearing which is to be held in Newark, and this visit will be his first trip away from his residence. In Mr. McCarter's absence General Harries, first vice-president of the American Electric Railway Association, will preside at its meetings in Chicago.

Mr. McCarter's absence from the Chicago convention is particularly to be regretted because of the great interest which he has taken in the welfare and work of the association during his administration as president. The most conspicuous part of this work, perhaps, was the long tour which President McCarter with other officials of the American Electric Railway Association took through the country last spring, but in many other ways he has manifested his great interest in the affairs of the association and his concern in its welfare. All who are acquainted with his resourcefulness and energy realize that only the most stringent injunctions from his physician have kept Mr. McCarter from presiding at the American Electric Railway Association this year.

NEWS FROM AUGUSTA

It was a matter of universal regret that J. H. Pardee, co-chairman of the entertainment committee and vice-president Augusta-Aiken Railway & Electric Corporation, could not attend the convention because of the Augusta strike. Nevertheless, he found time to send a cheering message to the boys on the Pennsylvania Special as follows:

"Greetings to you and all my friends. Regret I cannot be with you. We have won the strike and nearly all cars running as usual. Governor Brown of Georgia and Mayor Barrett of Augusta have demonstrated that life and property are safe and secure and that the wrecking of corporation property will not be permitted."

In reply the train committee wired:

"Our congratulations; note you are still getting away with the candy. Train greatest ever. Regret your absence."

The third annual picnic of the employees of the Los Angeles (Cal.) Railway was held at Redondo Beach on September 14. About 10,000 people participated in the program of entertainments.

PENNSYLVANIA SPECIAL

Had it not been for the regular calls to the dining cars, the delegates on the Pennsylvania Special would have had little realization of the rapid flight of time. The ingenuity of the entertainment committee was manifested by starting the travelers off in joyous mood by means of showers of confetti and the noble efforts of a brass band of juvenile ragamuffins. The hilarity of the start was further enhanced by the kidnapping of several stay-at-homes, who were permitted, however, to leave the train at Manhattan Transfer. The showers of confetti and the lassoing of the newcomers with colored paper ribbons was repeated at Newark, Philadelphia and Pittsburgh.

Ample musical entertainment was provided by a pianola in the observation car and by a Victrola in the smoking car.

Before the train reached Philadelphia a presidential poll was taken with the result noted elsewhere. The sporting proclivities of the delegates were partly satisfied by a pool on the time of arrival at Chicago. During the afternoon tea was served for the ladies.

The winners in the whist tournament were Mr. and Mrs. W. B. Rockwell and Mrs. Calvert Townley.

The 164 delegates on the train were presented with a handsome souvenir booklet which contained the entertainment program, general railway and convention information, with map of Chicago, and an alphabetical directory of all passengers. The train was in general charge of C. R. Ellicott, co-chairman of the entertainment committee.

UP FROM DOWN SOUTH

In two cars that left Atlanta, Ga., Saturday afternoon came a big delegation. On the way to Chicago a stop was made at Mammoth Cave and again at Louisville, where the party enjoyed the hospitality of T. J. Minary, president of the Louisville Railway Company. The travelers were loud in their praises of H. C. Bailey, division passenger agent of the Louisville & Nashville Railroad in charge of the party, who is pronounced to be the "greatest little personal conductor in captivity." The autograph roster supplied to the Electric Railway Journal includes H. B. supplied to the Electric Railway Journal includes H. B. Johnson, Roane Waring, J. E. Southwell, E. W. Ford, Perley A. Thomas, T. W. Passailaigue, I. H. McArthur, M. L. Corbett, T. H. Williamson, L. LeMay, J. H. Haylow, R. Meuter, H. A. Coles, L. Y. Dawson, A. A. Wilbur, W. R. Cornell, W. A. McWhorter, J. T. Chambers, T. C. Folsom, L. D. Mathes, C. H. Harvey, S. J. Herrell, G. K. Dustin, W. H Smaw, E. H. Ginn, R. W. Williams and Fred Markham.

NEW YORK CENTRAL SPECIAL

The New York Central Special arived on Sunday at 1:30 and brought 167 enthusiastic delegates and supply men from New York City, Boston and central New York. When the train left New York it consisted of ten cars, but two cars more, from Boston, were added when the train reached Albany. Other delegates boarded the train at Schenectady, Utica, Syracuse and Rochester. With forethought the train committee had arranged for continuous entertainment in the observation car at the rear of the train and in the buffet car at the head of the train, and in these two cars the passengers gathered in almost equal number. The ladies' Irish-lace bridge party was held in one of the dining cars at 8:30 Saturday evening. A special folder, which contained the timetable of the train, program of the events and wise sayings of some of those on board, was delivered to every passenger. Candy for the ladies and solid and liquid refreshment for everybody at all hours were amply provided for. C. C. Castle was in general charge of train arrangements, and the passengers say that Charles treated them finely from start to finish. Mr. Castle himself modestly declares that it was George Higgins, of the New York Central, who made things pleasant for the party.

THE SOUTHERN TRAIN PARTY

Headed by D. A. Hegarty, manager of the New Orleans Railway & Light Company, the Farthest South contingent blew in at 10:30 Sunday morning. Some of Mr. Hegarty's party got away from him before he started, but he finished strong with this aggregation: L. C. Datz, Howard McNair, W. H. Renaud, Jr., and H. J. Jamonville, of the New Orleans Company; L. C. Stivers, of the American Cities Company; C. E. A. Carr, of the Algiers Railway & Light Company; C. J. Griffith and Mrs. Griffith, H. J. Dressell and Mrs. Dressell; T. H. Tutwiler, A. D. McWhorter and C. B. Proctor of the Memphis Street Railway Company; M. S. Sloan, C. A. Avant, F. M. Weld and T. R. H. Daniels, of the Birmingham Railway, Light & Power Company.

FREE RIDES FOR DELEGATES

Through the courtesy of the South Side Elevated Railroad, Chicago, B. I. Budd, president, delegates have been presented with complimentary passes good during convention week. A cordial invitation to visit the company's properties has also been extended.

THE COMMONWEALTH COMPANY'S INVITATION

Delegates to the convention are invited by the Commonwealth Edison Company to visit its power plants and substations. Anyone wearing an official badge will be welcomed and shown every possible courtesy. This invitation will appeal with especial force to railway men because of the fact that the Commonwealth company carries by far the largest railway load in the United States, and its president, Samuel Insull, is a leading advocate of the advantages of deriving power for railway purposes from central stations.

ILLINOIS ELECTRIC RAILWAY ASSOCIATION

The Illinois Electric Railways Association has inaugurated a departure for associations in general in that it has established headquarters in a commodious booth in the Arena where the members may spend their leisure time. Space 61 has been fitted with furniture and several companies have sent in a suply of various forms of advertising. A stenographer is in attendance and a telephone has been installed for the use of members and their friends. The object of establishing a headquarters booth is not only to provide a headquarters for the members but to extend greeting to all members of the national association. The association is represented by the officers of the association and the executive committee as follows: Edwin C. Faber, president; A. J. Purinton, first vice-president; C. M. Wilcoxon, second vice-president; C. E. Flenner, secretary and treasurer; executive committee, H. E. Chubbuck, chairman; A. A. Anderson, M. E. Sampsell, B. I. Budd, J. R. Blackhal and W. C. Sparks; also the following chairmen of standing committees: L. E. Gould, George Quackenbush, Frank Johnson and John Leisenring.

The Acme Indicator Company, of Cleveland, O., is exhibiting a new automatic street indicator operating under service conditions at space 625.

REPORT OF THE SECRETARY-TREASURER OF THE TRANSPORTATION & TRAFFIC ASSOCIATION*

The expenses of the year have not differed greatly from those of 1911, though there have been some new committees formed and the work has considerably increased over that of the previous year.

Speaking somewhat personally, and perhaps duplicating some of the expressions of Mr. Shannahan, I beg to call attention to the new association publication, the *Aera*. No new movement that the association has inaugurated in recent years has, to my mind, so closely welded the membership as this decision to issue a monthly publication. Of course, you must understand, however, that to maintain the standard established by the first issues to date the membership must be loyal in its support of the *Aera*, and the officials of the member companies and individual members as well must be consistent in supplying the material to fill the pages of the new book. It is not necessary to be a literary expert to do this. What the railroad man wants is a recital of facts that are interesting and valuable and that will cover some phases of the work which receives his daily attention. The Question Box feature of the *Aera* is something that deserves your hearty support. It does not require much time for you to sit down and dictate answers to queries appearing therein, and certainly there must come up almost daily in your work little problems which would form the basis of a question which you could send to the secretary's office and upon which you could obtain information inside of thirty days. The National Electric Light Association has developed this Question Box splendidly, and it serves a useful purpose to some 15,000 members. The electric railway industry offers at least as wide a field and, as the secretary of your association, I hope the members of the Transportation & Traffic Association will not lag behind in making this Question Box the success that it is destined to be with proper support.

DATA SHEETS

I desire to call attention to the matter of inquiry forms. Perhaps because of having to handle most of those sent out, I realize the extent of their distribution fully as well as any of the members. It is needless to call attention to the usefulness of the information which is collected in this way. At the same time, it has been realized that many companies, particularly the smaller ones, have found it a hardship to answer any considerable number of inquiries, and with more than fifty committees at work it is quite likely that a comparatively large number of data sheets may be developed in a single year. Realizing this, the association has this year put into effect a plan through which a single member company will receive but 20 per cent of the total number of inquiries sent out in any one year.

In other words, we have divided the various companies into five sets, each one of which receives an inquiry in turn. This means that with a membership of 400 companies but eighty receive a given data sheet, and these eighty companies will not receive another inquiry until the four other sections have each received a different data sheet. This plan will relieve you of answering 80 per cent of the inquiries, but it will not be successful unless the 20 per cent that you do receive have proper attention and the committee is placed in the possession of the data required to carry out the instructions of your executive committee. When you receive an inquiry, therefore, please think of this new plan, send along the information requested and do not leave it to somebody else to provide it, as the somebody else will not receive that particular data sheet, and we shall be without information unless you see to it that the data are supplied.

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Chicago, Oct. 7-11, 1912.

STANDARD RULES

Your president has called attention to the very general use to which the standard rules adopted by this association have been put. Shortly after the convention it is the purpose of the association to issue to each member a copy of each recommended standard that has been adopted by this association. This will be sent you in loose-leaf form with a proper loose-leaf binder in which the same may be inserted. From year to year the new standards adopted will be sent to be added to this folder. It is hoped in this way to bring about greater use of the many excellent recommendations of your committees and afford you a means of determining just what has been concluded to be best practice without having to search through the books of the association for the information. Standardization is the order of the day, and nowhere can it be better applied than in the electric railway business. The Transportation & Traffic Association should not fall behind the other associations in making use of standards or of recommended practices which the judgment of your committees suggests from time to time. Let us start the new year by making a study of just what has been developed by your association, with the idea of putting it into effect on each of our systems or suggesting to the association ways and means in which improvements may be made. Unless something of this kind is carried out, the co-operative influence of association work is lost, and standards adopted but unused become purely ornamental and seemingly an indication of just how far in theory really practical men may go.

I should like to take this opportunity of thanking the officials of the member companies for the help extended this year in replying to communications from the secretary's office. Many of these required answers in considerable detail, and it has been most gratifying to note the cordial responses which the members have made.

EXPENSES FOR THE FISCAL YEAR ENDED SEPTEMBER 30, 1912.

Executive committee	$ 538.73
Committee on subjects	82.50
Committee on interurban rules	145.75
Committee on city rules	40.64
Committee on express and freight traffic	68.30
Committee on passenger traffic	162.94
Committee on fares and transfers	152.75
Committee to develop uniform definitions	24.40
Committee on construction of schedules and timetables	387.25
Joint committee on express and freight accounting	34.50
Joint committee on block signals for electric railway operation	80.08
Proceedings	2,955.73
Total	$4,883.62

The trend of present practice in steam boiler design is shown by an article in one of our English contemporaries, which states that the chief electrical engineer of the Harrogate Electricity Works maintains that the generation of steam calls for a radical change in present-day practice. He claims that electrical companies have too long been content to use boiler plants furnishing an average of from 2 lb. to 3 lb. of steam per hour per square foot of heating surface. Such practice involves the use of enormous boiler installations out of all proportion to the size of the generating plants. Reference to the plans of modern works equipped with from 10,000-kw to 20,000-kw units of power shows a separate boiler house for each generating plant. These boiler houses are built end-on to the power house, and impose a heavy capital cost for boilers, buildings, flues and chimneys. They also involve heavy losses in boiler, steam pipe and flue radiation. The solution of these difficulties, he considers, appears to lie in the introduction of gas firing, by means of flameless surface combustion on the lines first discovered by Sir Humphry Davy and more recently developed and set out by Professor Bone in his lectures before the Royal Institution of Great Britain in 1911. So far as investigations have gone at present it is shown that an evaporative duty from boilers exceeding 20 lb. of steam per square foot of heating surface can easily be obtained with a thermal efficiency corresponding to the transmission to the water in the boiler of nearly 95 per cent of the energy represented by the net calorific value of the gas.

PRESIDENT'S ADDRESS TO THE ENGINEERING ASSOCIATION

BY E. O. ACKERMAN

It is a high honor to address you at this, the opening of the tenth annual convention of our association, as its executive officer. It affords us a great deal of pleasure to greet the many members and friends of this and other allied associations that have assembled here in Chicago to take part in the convention, and we are especially glad to extend this welcome to those who have come to assist us in our work.

We are particularly fortunate in the selection of Chicago, the metropolis of the Middle West, as the convention city, where the electric railway men of the United States, Canada, Mexico and South America, from Cape Breton to Hawaii and Manila, and from Winnipeg to Montevideo, are greeted with the magnificent hospitality of her citizens and the hearty welcome of her officials.

The diffusion of knowledge in the art of electric railway transportation should enable us to render more efficient service to the public, whose gratitude will be reflected in a spirit of more friendly relations. The companies which you represent will have reason to expect that after this week of conference with men of similar vocations, where topics of common interest are discussed, you will be made stronger and better engineers and able to handle more efficiently the every-day problems, and the enthusiasm of the gentlemen now assembled in Chicago is the assurance that they will not be disappointed.

Your executive committee has made little or no change this year in the general method of handling the work of the association. It has responded most generously to the call of your officers for counsel, for which I wish most heartily to thank its members. In selecting subjects for consideration by the various committees, your executive committee found the field expanding so rapidly that it was not possible to treat every subject presented with the usual number of committeemen. It therefore selected and assigned for consideration this year only those subjects which in its judgment were of the most importance. I might add that it seems desirable that the number of members on committees should be further increased in order that all of the subject matter desired by your executive committee may be thoroughly considered and our association thereby keep in advance of the actual needs of its constituents. The response to the call for members to take up committee work this year was most generous, and the zeal and painstaking care with which the work was prosecuted is very gratifying. While many of the committeemen were extraordinarily busy with their regular professional work they have generously labored in the interest of the association, and the results of the deliberations of your committees are to be commended. They have given us an excellent set of reports comprising some 500 pages of printed matter which have been in your hands for some time, and as you are all familiar with the recommendations of the committees which are to come before you for consideration I trust the discussions will be full, free and to the point.

To the gentlemen of the committees who have labored so diligently during the year I wish to express my sincere thanks and assure them that the association is truly grateful for their long-continued and efficient service and its excellent results.

I regret that on account of the large amount of professional work on hand with the men who were most experienced and have been most interested in the training of mechanical apprentices it was decided to omit the committee on education of engineering apprentices for this year. In view of the great importance to the railway companies of the training of mechanics in railway work and the deep interest taken in the subject by members of our association, it is recommended that a committee be appointed to continue the work during the coming year, and as the work is largely the training of young men to become good mechanics, it is suggested that the name of the committee be changed to the committee on the education of mechanical apprentices.

You will note from the reports that several committees and sub-committees have been working this year jointly with other associations, and representatives of other associations have conferred with our committees in the consideration of subjects of mutual interest. At a result the subjects have received consideration from a wider viewpoint and the reports have received much added value. The spirit of co-operation is highly beneficial and should be widened to the broadest extent.

The adoption of proper "standards" and "recommended practices" by the association is of such prime importance to the economical construction and operation of electric railways as to demand the closest attention and consideration by every member of our association, and I trust that the recommendations of the committees, which are in your hands, will be weighed with great care and your approval registered accordingly. While the method for the consideration and adoption of "standards" and "recommended practices" adopted at our last convention is of great value to the association, there is need of further revision so that the work may be more effectively carried into the practice of our member companies. While we look upon the list of "standards" and "recommended practices" already adopted with a large degree of satisfaction, the work has only just begun and the association is to be congratulated upon the progress it has already made in that direction.

The American Electric Railway Association has, in its wisdom, begun the publication of a monthly magazine, devoted to the electric railway industry, upon the advisory board of which the several allied associations are represented. The advent of the *Aera* is hailed by the engineers with great satisfaction and marks the beginning of a greater usefulness of the association to the individual. It will greatly assist in the interchange of ideas and create a desire in, and afford the opportunity to, the individual member to study the electric railway business more thoroughly than ever before and enable him to keep in close touch with the work of his associates. It thrills him with enthusiasm and drives him to a higher standard of efficiency. It will broaden the scope of knowledge in the art with marvelous rapidity, and the association is to be congratulated upon the excellency of the publication.

In order that the work of our association should be more effective and the association receive due credit for the diffusion of knowledge and the increasing of the efficiency of its members, it has been suggested and is desirable that each member of our association should file with the executive officer of the company which he represents a written report of all the information of value obtained at the convention, with suggestions as to how said information may be employed in the betterment of local conditions.

In closing I wish to express my high appreciation of the work of our secretary, who, notwithstanding the fact that his regular professional duties have been largely increased and the duties of secretary of this association have been multiplied, has faithfully and efficiently carried on the work of secretary of this association. To him we are indebted to a large degree for the success with which we have met, and I, therefore, tender to him the hearty thanks of the association.

The Indianapolis Brass Company has installed the front end of a car to show the effectiveness of the motorman's mirror. The mirror consists of a malleable-iron frame attached to the side of the car so that the pivoted glass may be turned to an angle which will give the motorman a clear view of the back end of the car, thus enabling him to use better judgment in starting or stopping. This company is also featuring the new "Samson" trolley splice. This device is simple in design and provides a smooth under-run which eliminates arcing when the trolley wheel passes under it.

PRESIDENT'S ADDRESS TO THE CLAIM AGENTS' ASSOCIATION

BY H. K. BENNETT

In carrying out the usual custom of making an address at the opening of our convention, I would much prefer that you should consider my remarks more as a report of my stewardship than as an address. I greet you all in the name of the executive committee to the meeting of the "live-wire" branch of the association. It is a source of much personal satisfaction to each one of your officers to see such a representation as we have here to-day. That there is no North, no South, no East, no West—as the saying goes—is evidenced by the representatives gathered here from all parts of the country. I have endeavored to carry out your wishes and those of the executive committee to the best of my ability, and whether the "live wire" has been kept fully charged or not is for you to judge.

At the commencement of the year I outlined a policy, or, rather, chose five ideas which I thought would be for the best interests of all concerned, and I have faithfully endeavored to carry them to a successful issue.

These five ideas were as follows:

(1) Prevention of accidents.

(2) The necessity for closer affiliation between the Claim Agents' Association and the Transportation & Traffic Association.

(3) Larger increase in associate membership.

(4) Larger representation of member companies in the Hooper-Holmes Information Bureau.

(5) To stimulate member companies to the point whereby the 1912 convention would be the largest in point of attendance we have ever held.

At the meeting of the executive committee in January the first proposition was taken up, and as a result Messrs. Carson, Weh and MacDougall were appointed a committee on "safety league" work, and their report is a part of our convention program.

As a result of a meeting with President Shannahan of the Transportation & Traffic Association, and correspondence with Mr. Danforth of the Public Service Railway of New Jersey, who was chairman of a special committee on the training of transportation employees, Messrs. Drown, MacDougall, Weh and Tichenor were appointed at the January meeting to confer regarding this important matter. The result is a joint meeting between the two associations on Thursday morning.

We have taken in twenty-three members during the year. This matter was made the subject of a special letter, which was sent out to each member company on the question of increased membership.

From the close of our convention last year to Oct. 1, 1912, fifty-seven companies sent in 21,765 reports to the Hooper-Holmes, as against sixty companies sending in 17,797 reports the previous year. The increase in reports sent in from the previous year is 3,968, and 10.51 per cent records were reported back to member companies this year against 8.38 per cent the year previous, or a gain of 2.13 per cent. This is the subject of a special report by Mr. Drown.

Promises of attendance have been received from all quarters, largely from men who have never before attended, and present indications point to an attendance equal to that of last year.

Your president is deeply grateful for the unanimous support of his executive committee. To these gentlemen will be due the credit for any success of our convention. To your ex-president, Mr. Drown, I am also deeply indebted for his willingness to assist whenever called upon. To the subjects committee, of which F. D. Edmonds of New York was chairman, to each and every one of this committee, a special vote of gratitude is due. Their duties were carried out with the single thought of the welfare of every member company, and the fruit of their labor is before you. Every committee has worked nobly. Each individual member of this association has responded to every call made upon him, and I beg now to thank you all again for making my executive year one long to be remembered.

Many invitations have been received and accepted from various associations and organizations in various parts of the country on account of my position with your association, thus always pleasingly reminding me of you at such times.

During the year your president received over 2000 individual letters, over 1800 of these requiring a personal answer, and in addition to this more than 1800 circular letters over his personal signature were sent to member companies.

The report of the "safety league" committee shows great care in its preparation, and I offer as a suggestion the formation of a permanent "safety league" committee for this association.

I would not be honest with myself were I to stop here without saying that our genial secretary, Mr. Davis, has ever been at his post of duty, putting on the brakes when your president was perhaps a little too keen on some subject, counseling with his wisdom, and assisting in every way possible. Distance was no bar to his help, and I thank you, Mr. Davis, for your many courtesies, and may God keep you with us for many years.

To Secretary Donecker the thanks of all are due. His personal interest in this association is beyond the comprehension of the individual member. His hand is on every "live-wire" proposition, and he has worked hard and faithfully for your welfare, and to him I extend my sincere and personal thanks for all his help during the year.

A duty was placed upon the president in January by the executive committee to assign the subjects and speakers for this convention. I leave the wisdom of this procedure to your judgment.

The keynote of this convention is what, to my way of thinking, is and always will be, the subject ever new—prevention of accidents—and I trust that each one of us will take a fresh hold on our daily problems after listening to the able remarks which will be made.

I want to call special attention along this line to the work which was done last spring and is being carried on this fall by the Public Service Railway of New Jersey, which has had the services of F. S. Hughes of Los Angeles in conducting a campaign among the school children of its territory and the employees of the company. This company has the honor of being the first this side of the Rockies to carry on this work, which has had results far beyond your imagination.

I thank you again, gentlemen, for your many courtesies, and you may be assured that I shall always hold in grateful remembrance your many kindnesses to me, and I pledge to you and to the association the best there is in me at any time that I may be called upon to work for it, and may God keep us for many more happy meetings together.

The Bureau of Foreign and Domestic Commerce, Department of Commerce and Labor, proposes to issue a bulletin, entitled "Commercial Organizations," which will give the results of an investigation by E. A. Brand, formerly commercial agent and now assistant chief of the bureau, of the activities of seventy commercial associations in the United States, with special reference to the development of foreign trade. The territory covered in the investigation included cities in New England, New York and Pennsylvania, and in many towns of the middle West. In addition to their activities in the promotion of foreign trade, many other phases of the work of these bodies are described, including industrial expositions, methods of developing wholesale and retail trade, municipal publicity, improvement of transportation facilities and service, expansion of industrial enterprises, campaigns for conventions, membership, etc.

PRESIDENT'S ADDRESS TO THE ACCOUNTANTS' ASSOCIATION

BY P. S. YOUNG

This is the first meeting of this association since the amendment of its constitution was passed providing for admission of accountants without the qualification of their being electric railway accountants. While we consider it desirable, of course, that an accountant should have electric railway experience, we believe that by including in our association all accountants now eligible we are opening the way for a wider discussion at our meetings and making it possible to take a broader view of our problems. On behalf of the association, therefore, I welcome our new members and venture to hope that our intercourse may be mutually profitable.

The scope of the accountant's work in the business world is continually broadening, and nowhere is this more apparent than in the electric railway business. The electric railway business has frequently been referred to as a one-man business. This condition cannot obtain much longer, and as a matter of fact the last few years have shown a decided change in this respect. The time has passed when all the details connected with the management of a road could be efficiently handled by one man, no matter how great his ability. Efficiency requires special ability for each particular duty or class of duties.

There is a great opportunity in the accounting department of an electric railway for the study of the facts relating to the operation of the road, and nowhere is it more important to have specially trained men than there. There is an intimate relation with all departments which affords opportunities for the acquisition of information not even in the possession of the one who, you might say, would be supposed to possess it. The facts of the business are marshaled before one there and pass in procession in such a way as to leave an indelible impression upon the mind of the man who can see them. How important, therefore, it is that everyone in the accounting department should have a mind so trained as to perceive these facts and their relation to the operation of the property. The function of the accountant is not alone to present the facts, but to understand them and to form a judgment from them. The problem to be met, therefore, in the education of an accounting force is largely that of educating the judgment of the individual. Of course, the interest of the individual in the problems dealt with must be aroused, but once awakened how shall it be stimulated until the obstacles to the training of a ripened judgment are overcome? I believe that the action the association has taken this year in publishing a monthly bulletin and forming company sections is a step in the right direction, but I should like to see our association institute a lecture course, or class, if you like, to which members of the accounting department of a member company might be eligible with or without a payment, according to whatever arrangement might be made. If the members think well of such a plan, I should like to see a committee appointed to consider its feasibility.

One of the most important facts the industry is facing is the high cost of living. An industry feels this condition as does an individual. The individual looks around to find a means of increasing his income, and failing to obtain it, he must curtail his wants. The corporation's wants are those of its public, whose wants are increasing, and there is no possibility of curtailing them. So there is nothing to do but to try to increase its income. It is very gratifying to know that the American Association has asked this association for help in solving this problem, and a committee of this association has given the matter considerable attention in the past six months. It is not something for which a solution can be found at once, but it would seem as if the association was on the right road and making progress.

The very efficient joint committee of the Engineering and Accountants' associations has prepared a report that is in every respect worthy of the consideration of the two associations.

This year we have three reports made by three committees of our association acting jointly with three committees of the Transportation & Traffic Association. These reports are all upon most important and timely subjects.

There is a report of a joint committee of this association and the Engineering Association on life of railway physical property, and there are also reports from our own committees.

The instructive and illuminating address on "Overhead Charges," by Dean Cooley, last year inspired us to invite him to address us again on the same subject.

We have a paper on "Intangible Values of Electric Railways and Their Determination from Accounts," from W. H. Hagenah, an authority on this subject and a man who has made a study of the financial relations of public utilities, the government and the public.

This is the program, and I hope that all members, both old and new, will add to the general interest by expressing their ideas on the various subjects during the period allotted for discussion.

MONDAY MEETING OF THE CLAIM AGENTS' ASSOCIATION

The first session of the Claim Agents' Association was held in the Green Room at the Saddle & Sirloin Club yesterday afternoon. The meeting was called to order at 2:30 p. m. and President Bennett made the annual address of the president, which is published elsewhere in this issue.

The annual report of the executive committee was then read. It stated, among other things, that a telegram of sympathy and regret would be sent to President McCarter in regard to his inability to be present at the meeting.

The annual report of the secretary and treasurer was read. Afterward the report of the special committee on index bureau work was presented.

The next order of business was the presentation of papers on the subject of "The Organization, Maintenance and Operation of the Medical Department of a Large Street Railway Company," subdivided as follows:

(a) "Its Relation to the Claim Department," by E. L. Lindemuth, claim agent Wilkes-Barre Railway. A written discussion by J. S. Harrison, claim agent Jacksonville Traction Company, was presented.

(b) "Its Attitude Toward the Public," by W. E. Robinson, claim agent Cincinnati Traction Company. A written discussion by Wallace Muir, assistant counsel Kentucky Traction & Terminal Company, was presented.

(c) "Its Attitude Toward the General Practitioner," by C. B. Proctor, claim agent Memphis Street Railway. A written discussion by Dr. W. M. Holtz, Pittsburgh Railways, was presented.

(d) "Expert Medical Testimony," by Dr. John P. Moorhead, chief surgeon Interborough Rapid Transit Company. A written discussion by S. B. Hare, claim agent Altoona & Logan Valley Electric Railway, was presented.

With gross revenues the largest in their history, the net income of the steam railways of the United States for the year ended June 30, 1912, after deducting operating expenses and taxes, amounted to $762,663,579, or 3.81 per cent on their estimated value of $20,000,000,000. The average mileage of line operated in the United States has increased in the five years approximately 8.4 per cent. This has been attended by an increase of over 12 per cent in miles of all track—the auxiliary track, that is secondary track, yard track and sidings, having increased over 55 per cent.

PRESIDENT'S ADDRESS TO THE TRANSPORTATION & TRAFFIC ASSOCIATION

BY JOHN N. SHANNAHAN

This meeting marks the beginning of the fifth annual convention of the youngest of the affiliated associations—the "T. & T." In these past few years much good work has been accomplished. In the earlier days of association work the greater part of the convention time was spent in the reading of papers to which some man had given much time and thought but to which, I regret to say, but scant attention was paid. To-day almost the entire time of the association in convention is given to the reading and discussion of the reports of standing committees. A committee of six, embracing geographically, as nearly as possible, the entire country, having spent nearly a year in research and careful investigation, brings to the attention of the association the results of its work, with, in most, cases, definite recommendations. In January, 1908, President Allen created five standing committees; to-day we have fourteen. This illustrates very clearly the growth in volume and breadth of the work being done by this association.

The number of committees has made necessary the reading of certain of the reports by title only, in order that there remain sufficient time for the discussion of these reports. Your executive committee believed that placing the printed copies of the reports in the hands of the members a sufficient time before the convention would overcome any objection to this change.

Ten years ago, when the Engineering Association held its first meeting, it was confronted by the greatest diversity in the practice of engineering as applied to the electric railway industry. Since that time it has done a great work in the standardization of material. This was well illustrated by Mr. Gove in his notable article in the September *Aera*, in which he states that the use of the brakeshoe standards created by the Engineering Association had enabled his company to save $30,000 per annum on this one item alone.

Since the organization of the Transportation & Traffic Association it has done much excellent work in the standardization of methods, particularly in the adoption of standard codes of rules for the government of both city and interurban lines. That much along this same line yet remains to be done is clearly indicated by the committee reports now in your hands. I am convinced that in no one respect can this association accomplish more for its branch of the industry than by the standardization of methods, and I strongly urge the association and the incoming executive committee to take vigorous steps to this end.

Included in the fourteen standing committees are five joint committees, two with the Engineering Association, block signals and train operation; two with the Accountants', fares and transfers and statistical unit, and one with the Claim Agents', training of transportation employees. I allude to this feature of joint committees where the work of the associations overlaps only as an indication of the cordial relations existing. Of the above committees two are new, namely, those on train operation and statistical unit. The committee on definitions is also a new one.

The present practice of confining the attention of the association in convention to the discussion of committee reports has practically eliminated the work formerly done by the subjects committee. In view of this condition, I recommend the elimination of this committee from the list of standing committees.

Several times during the past few years, in discussing in convention the report of the interurban rules committee, it has been suggested that representatives of this association confer with representatives of the American Railway Association, to the end that the respective codes of rules be brought into closer agreement. Two years ago J. W. Brown, then chairman of the interurban rules committee, had some correspondence with Mr. Rice, chairman of the committee on transportation of the American Railway Association, in an effort to procure a conference. Mr. Rice wrote very frankly, saying he felt that such a conference would be fruitless. Several months ago General George H. Harries took the matter up with Daniel Willard, president of the American Railway Association, with the result that Mr. Rice wrote me under date of July 16 that he would be glad to have present at the next meeting of the committee on transportation a representative of this association and would later advise me of the date of meeting. Having heard nothing further from him, I assume the committee has not as yet held a meeting.

It is a source of genuine gratification to me to announce that through the efforts of Alexander Shane the Indiana Commission has adopted as standard the code of interurban rules as amended by the present interurban rules committee.

I wish to make grateful acknowledgment at this time of the results of the campaign for individual members carried on by the committee composed of H. A. Nicholl, Henry Reynolds and P. P. Crafts.

During the past year, and largely through the efforts of President McCarter, Arthur Brady and H. C. Donecker, there has been inaugurated the publication of the *Aera*. The purposes sought to be accomplished were well set forth by Mr. Brady in the first issue. That it will greatly aid in furthering the aims of the association is generally conceded, and I bespeak for it the generous support of all our members. The Question Box will prove to many an attractive feature, and I hope every man will give of his knowledge and experience to make this department more interesting and helpful.

One thing I desire to call to the attention of the incoming president of this association is the great desirability of appointing the committee chairmen as soon after this convention as possible. In the years past it has been November before these appointments have been made, and this seriously shortens the time available for the work of the committees, as their reports must be in the hands of the secretary by the middle of July. At the first meeting of the executive committee subsequent to the convention the work to be done by the standing committees is determined, and it would prove very desirable to have the chairmen of these committees in attendance at the first meeting of the executive committee.

I will not attempt to speak separately of the reports of the various committees to be presented at this convention, reserving such comment as I care to make for the reports as presented. But I can take this opportunity of saying that I believe you will find the work to have been well done. I am glad to make acknowledgment to those men who have so willingly given of their time to make the work of this association successful. To the members of the executive committee my special thanks are due. If the success of this association is due to one man more than to any other, then the one man is our splendidly efficient secretary, H. C. Donecker.

In conclusion, let me urge the members to be prompt in attending the sessions at this convention, and to discuss freely the reports to be presented.

In connection with the celebrations at Glasgow, Scotland, commemorating the running of the first steamboat, the *Comet*, by Henry Bell, the Glasgow Corporation Tramways has been running illuminated car floats over its system. One of these cars was designed by Wylie & Lockhead, Ltd., Glasgow. From bowsprit to taffrail the tramway *Comet* is faithful to the lines of the original. Suspended from the floor of the car was a canvas curtain on which a representation of the sea was painted to heighten the desired effect.

MONDAY'S SESSION OF THE ENGINEERING ASSOCIATION

President E. O. Ackerman of the Engineering Association called that association to order at 2:20 o'clock yesterday afternoon in the Brown Room.

President Ackerman then read his address, which is published on page 648 of this issue. He then called for the report of the executive committee.

REPORT OF THE EXECUTIVE COMMITTEE

Secretary Litchfield then read the report of the executive committee. Among other statements, the committee said that it had been informed by the secretary of the American Association that only about fifty member companies had replied to the letter ballot which was sent out on engineering standards. As the ineffectiveness of this method of adopting standards was apparent, the executive committee had decided to suggest to the incoming executice committee that arrangements be made for the submission to member companies for vote only of those matters approved by the Engineering Association as "standards," and that matters for "recommended practice" should receive the approval of the Engineering Association only. The executive committee also recommended that the recommendations of the association as standards be presented for action at either the annual or the mid-winter meeting of the American Association, also that matters recommended for standards should be carefully restricted to those of vital interest to all member companies, and which admit of, and are in proper shape for, general adoption by all. These suggestions would in effect form a revision of the existing code of rules for procedure for the adoption of standards.

REPORT OF COMMITTEE TO CONSIDER POSSIBLE REVISION OF CONSTITUTION

Secretary Litchfield then read the report of the committee appointed by the executive committee to consider possible revision of the constitution of the Engineering Association. The members of the committee, whose names were appended to this report, were H. H. Adams, W. J. Harvie, Martin Schreiber and Secretary Litchfield. The recommendations submitted by this committee were as follows:

(1) That the committee recommend to the executive committee that this year the president be requested to appoint a nominating committee, composed of three past presidents and two members at large not members of the executive committee, and present a ticket to the executive committee at least one month in advance of the convention.

(2) That the committee recommend to the executive committee that the nominating committee be informed that it is the sense of the revision committee that the interests of the Engineering Association would be best served by the retention in office of a majority of the members of the executive committee from year to year.

(3) That the executive committee upon receiving the report of the nominating committee shall submit to all company members the approved ticket and advise them that the ticket is to be voted upon by ballot at the convention, the ballots to be duly signed by the company's accredited representative, and that these ballots may be presented at the convention or sent in by mail in advance of the convention. Ballots will be received up to 6:00 p. m. of the day preceding the closing day of the convention and the results of the election are to be announced at the last convention session and officers installed in the manner prescribed by the constitution and by-laws. Ballots are to be counted by three tellers appointed in the convention by the presiding officer.

(4) That the committee recommends that the present arrangement of the organization should not be changed, but it believes an increased efficiency will be obtained by assigning to each vice-president a definite part of the association's activity, for which he will be responsible to the president and the executive committee.

It is suggested that the three vice-presidents be assigned, as may seem desirable to the president, to the following lines of the association's work:

(a) Association and committee membership.

(b) Publications.

(c) Finances (with particular reference to the apportionment of the association's money).

(a) In explanation of these three points, it should be said that the idea of the first was that one vice-president should make it a point to acquaint himself with the qualifications of members for service on technical committees and the executive committee, so that men who are particularly versed in some one special branch of the art may become easily available for appointment by the president to any committee. It is recognized that at the present time it is very difficult for the president to get information as to new members, and that therefore a procedure such as above outlined will be of great help to the president and of benefit to the association.

(b) "Publications": It will be the duty of this vice-president to familiarize himself and keep in touch with the various engineering matters which are to be published in the *Aera* and in the proceedings.

(c) "Finances": It will be the duty of this vice-president to see that the expenditure of the association's money is made in the manner most advantageous to the association.

(d) It is further recommended in case at any time it becomes advisable to elect as secretary and treasurer of the American Electric Railway Engineering Association the secretary and treasurer of the American Electric Railway Association, that owing to the technical nature of the work the president appoint a member of the executive committee to confer with the secretary.

APPOINTMENT OF NOMINATING COMMITTEE

According to these recommendations, the president then announced the following committee on nominations: H. H. Adams, chairman; Charles H. Clark, William Roberts, W. J. Harvie and J. M. Yount.

REPORT OF SECRETARY-TREASURER

Secretary Litchfield then read his annual report. He stated that the executive committee of the association had originally asked the American Association for an appropriation of $3,500 for the work of the Engineering Association during 1911-1912. The work of the committees, however, was found to be so great that, notwithstanding unusual efforts to reduce expenses, it was found that the expenditures would exceed the amount of the appropriation. Upon conference with the secretary of the American Association, it was decided to hold those vouchers which exceeded the appropriation until after Sept. 30, the close of the fiscal year, which had been done. To guard against a repetition, it was recommended that definite amounts be appropriated in the future to each committee, so that the chairman can regulate his expenditures. The general report follows:

EXPENDITURES

On vouchers duly approved by president and secretary	$3,265.28
Directly by secretary of American Association	309.62
Total charged against appropriation	$3,574.90
1911 proceedings	5,167.32
Total expense of Engineering Association for year ended Sept. 30, 1912	8,742.22
Since Oct. 1 there has been expended on vouchers duly approved by your president and secretary	420.87
Making total expenses exclusive of proceedings	3,995.77
Total expenses, including proceedings	9,163.09

REPORT OF COMMITTEE ON POWER DISTRIBUTION

G. W. Palmer then presented the report of the committee

on power distribution. It is published elsewhere in this issue. In explanation he said that one of the livest questions which the Engineering Association and the power distribution committee had to consider was the specification for joint use of poles. The power distribution committee in its consideration of that matter, at the direction of the executive committee, had reached the point where conferences had been arranged for by the duly accredited representatives of the other interests involved. Just at or about that time, however, as the result of a communication from the New York State Association and the American Railway Association, a special committee was appointed by those associations to take up this matter and consider some phases of it other than those which the committee on power distribution was considering. Consequently all action on this matter since that date (early in the spring) had been taken by the committee on joint use of poles which was appointed by the American Electric Railway Association and this committee, of which W. J. Harvie was chairman. The committee on power distribution, therefore, had finished consideration of this subject, except as it might be further requested to go into the matter by the special committee.

With reference to the specifications for overhead crossings of trolley contact wires at railway tracks and the specifications for overhead crossings of foreign wires with electric railway wires, the committee felt that the treatment which those subjects should receive at the hands of this association should be largely governed by the action which the association took later on in relation to high-tension wire matter. The committee felt that discussion of these topics should be deferred until after the discussion of the high-tension wire crossing matter. As for the concrete and tubular poles, the sub-committee having the matter in hand had done considerable work, but the committee as a whole was only able to report progress at this time.

In relation to high-grade rubber insulating compound, he said that the members would recall that at the last convention the committee on power distribution had under consideration a report on high-grade rubber insulating compound. At the instance, as he understood it, of certain members of the equipment committee, and others who were concerned, the matter was referred back to the power distribution committee with request to consider the subject jointly with the committee on equipment. The course which the matter had taken had seemed to be that the committee on equipment considered it had little, if any, use for 30 per cent Para rubber compound, and was not particularly interested in it, in fact it might not want any. Through various circumstances noted somewhat at length in the report, nothing had been accomplished during the year, and the committee was at the same stage in relation to this matter that it was last year. The committee on power distribution, however, felt that it needed, and needed as soon as it could be brought about, a specification for 30 per cent Para rubber compound and wire insulation of that compound, both for submarine and underground cable use, and it did not feel that the necessities of the equipment committee, or that the necessities of the people representing the committee in respect to any equipment, should be allowed to hold up this subject.

There had been some consideration given in the past to the matter of stranding, and work had been done outside of the committee both by the Bureau of Standards of the United States government and by the American Institute of Electrical Engineers.

The stranding table referred to in the report was printed in Circular 31 of the United States Bureau of Standards, and in relation to that circular Mr. Palmer read a letter from the secretary of the standards committee of the American Institute of Electrical Engineers stating that the tables of Circular 31 of the Bureau of Standards had not been finally adopted by the A. I. E. E. as stated in the circular, but that they had been approved by the standards committee, and that the standard of copper resistivity employed in computing the table had been recommended by the committee on standards of the International Electrotechnical Commission at the last meeting of that committee in Paris. This letter also stated that no official action had at that time been taken either by the A. I. E. E. or by the I. E. C., although there was little doubt of such action.

In compliance with the direction of the executive committee, the power distribution committee considered the subject of trolley ears and had made a report on it. That report, when it came to the Bureau of Standards, was referred back to the power distribution committee, certain members of the standards committee feeling that the recommendation should not be adopted as it stood, and, further, that this matter of trolley ears was a detail of standard overhead construction which was being considered by the committee and should be considered in connection with that line of material. The revision of specifications for high-tesion, three-conductor, paper-insulated, lead-covered cable and the revision of the specifications for single-conductor, paper-insulated, lead-covered cable for 1200 volts were of minor importance, except that the conductivities which had been named had been changed and were in accordance with the rule of proposed standard tables both for stranding and for resistance of the wire.

Extended reference was made to the matter of revision of the specifications for overhead crossings of electric light and power transmission lines. At the time the committee took its last action on this matter, the specifications had not been adopted as standard by the steam railroad interests. The committee was informed, however, through the chairman of the general committee which considered this subject, that the American Railway Association had recommended the adoption of these specifications with some revisions of the matter, which revisions did not come to hand. The committee on power distribution felt that the report should be revised in certain particulars which are indicated.

With reference to the section which provides, "These specifications shall apply to overhead electric light and power line crossings (except trolley contact wires) over railroad right-of-way, tracks or lines of wires, and, further, these specifications shall apply to overhead electric light and power wires of over 5000 volts constant potential crossing or constructed over telephone, telegraph or other similar lines," the committee did not believe that the scope of the specification should be so extensive and therefore recommended that the latter part of the specification should be eliminated, so that it should read as follows: "These specifications shall apply only to overhead electric light and power line crossings (except trolley contact wires) over railroad right-of-way, tracks, or lines of wires."

As for the next topic, "Specifications for Trolley Wire," the committee reported a specification at the last meeting of the convention. The report of the committee was adopted, and the matter passed to the committee on standards and was adopted by it and went to letter ballot and later was adopted by a majority of the votes passed on that ballot. Since the last convention there had been several meetings between subcommittees of the American Society for Testing Materials and the committee on power distribution. The result of these meetings had been that the representatives of the American Society for Testing Materials agreed that the tests which the committee on power distribution recommended, particularly the torsion test, disclose defects in trolley wire which no other tests would show. The only question now between the two associations was the minimum number of turns which should be prescribed as necessary. The matter is progressing toward a satisfactory settlement.

The chairman of the committee then referred to the section of standard sections for grooved trolley wire and said that the committee submitted an enlarged drawing to make plain the previous intention of the committee.

In connection with the matter of electric wire and cable terminology, Mr. Palmer said that this matter had received more or less discussion and action by this committee and asso-

ciation. He then read a communication from Dr. A. E. Kennelly, chairman of the standards committee of the American Institute of Electrical Engineers, as follows: "Secretary Hutchinson of the A. I. E. E. has referred to me your inquiry of June 19. I beg to say that the standards committee appointed a sub-committee early this year to investigate electric wire and cable terminology. The report showed that there was considerable difference of opinion among different manufacturers on certain terms employed in the wire and cable business. The standards committee decided not to put out any authorized set of definitions. It requested the Bureau of Standards, however, to prepare such a circular and employ in this circular the definitions which received the main assent of the committee. The definitions issued by the Bureau of Standards are, therefore, official with the bureau and are recommended by the standards committee, but no final action has yet been taken by the standards committee. It is possible that, after a year or so, if the terminology becomes uniform with that adopted by the bureau, the standards committee may take final action."

The proposed specifications referred to in the report were merely tentative and were some specifications which had been used by some companies in the past. They are printed in this report more for the purpose of starting a discussion and securing information than for any other purpose.

After the presentation of the report and the additions as outlined the matter of revision of specifications for overhead crossings of electric light and power transmission lines was taken up for discussion. G. W. Palmer submitted a written criticism which had caused the committee to make a change in the paragraph on location in the high-tension crossing specification. The criticism was as follows:

"In looking over the report of the committee on power distribution, I find that on page 14, paragraph 5, there is a suggested change in the power-line crossing specification which provides in addition to the requirement that the poles or towers supporting the crossing span and the adjoining spans must be in a straight line, that the adjoining spans shall be of such height that there shall be no lifting-weight strain upon the supporting insulators, and I most strongly urge that this change be not made as it is written, if my interpretation of it is correct.

"Four years of experience in this kind of construction has taught me that it is a fallacy to attempt to grade up a line to meet the tower height, as it puts many unnecessary strains in a line which it is perfectly proper to build at the normal height from the ground.

"We have several such crossings and believe that they are of the very best construction and are far better than having so many high towers at a crossing. Therefore, if my interpretation of your changed rule is correct, I think that it is not only inconsistent with good engineering, which opinion is based on four years' practice with such construction, but it makes unnecessary expense of construction and a great deal of trouble of maintenance for the company doing this work.

"Please do not have your association adopt this change as it is written, for if the meaning is not as I interpret it, the language should certainly be changed so as not in any way to intimate the meaning which I get from the clause as written.

"I regret that I have only had time to read your report within a day or two and have not had time to send you some photographs of some splendid construction in contradistinction to this suggested clause, but I will be glad to furnish the same to your committee at any time."

Mr. Palmer stated that it was the thought of the committee in making its first recommendation that no lifting strain should be imposed upon straight line insulators as ordinarily used, and therefore it made the recommendation that the pole heights on each side should be such that there would be no lifting strain. But with special insulators and special devices for fastening the committee could see no reason why there should not be an abrupt change in grade if anyone considered it advisable or necessary.

J. H. Hanna remarked that as he understood the specification it was changed but slightly from the specification of the year before and had been formerly approved by the American Railway Association. The committee advised last year that it had not been so approved, that some members of the American Railway Association had some serious objections to it and that changes much more comprehensive than those which have been now submitted were desired. In consequence he wished to know whether the specification as amended in the report of the committee had been approved.

Mr. Palmer answered that at the meeting on standards the statement was made by Mr. Katte that the association which he represented, the steam railroad interests, would probably not adopt that specification in its present form. It was reported that on May 15, 1912, the American Railway Association presented a report, through its committee on electrical working, in which were included these specifications in complete detail, and these were approved at the convention and adopted by that association as "recommended practice." These specifications, as approved by the American Railway Association, contained a revision of its own, entirely separate and distinct from that proposed by the power distribution committee. This committee had recommended that the association adopt as standard the original specification, with the revisions which were presented and which had no reference at all to the revisions which were made by any other body. As the case stood, the National Electric Light Association had adopted the specification and made certain revisions. If the association should take the proposed action the specifications would be adopted with certain revisions of its own as the steam railroad interests had adopted the specifications with a few revisions of their own.

Mr. Palmer considered it necessary, as noticed in the report, to have a conference of the joint interests to agree on revisions of the specifications, to harmonize the differences and make them the same for each individual interest.

C. G. Young, New York, then moved that the specifications, as revised by the committee on power distribution be adopted by the association as recommended practice and that the committee be authorized to confer with the other parties in interest with a view to securing united action on the revisions proposed by the committee and other interests.

The motion was seconded by A. S. Richey and adopted.

SPECIFICATIONS FOR OVERHEAD CROSSINGS

President Ackerman announced that the next subject to be discussed would be that of specifications for overhead crossings of foreign wires with electric railway wires.

A member referring to paragraph 19, Appendix B, asked the reason why a minimum size of conductor should be specified for 5000 volts.

Mr. Palmer said that the committee felt that a certain size of wire was necessary regardless of any voltage which might be used on it for mechanical safety. A bracket of smaller size wire, with the smaller size voltage, would not carry the same disastrous consequence as it would if the voltage were higher, so the committee had made the recommendation that it did.

Professor Richey added that the reason why the dividing line was placed at 5000 volts was because the telephone engineers had advised the committee that their protective devices would take care of 5000 volts and under, while they would not take care of voltages over 5000; and as a good many of these foreign wires would be telephone wires and the specifications would be used in connection with agreements with telephone companies, their wishes were consulted somewhat in that matter.

JOINT USE OF POLES

William Roberts, Akron, spoke in favor of having a free space of at least 15 in. on each side from the center of the

pole; that is, if there was a cable to be strung in connection with a system of telephone or telegraph lines, that it be hung not less than 15 in. from the center of the pole, so allowing 30 clear inches of space for a man to climb through. He approved the position taken by the committee in this matter.

W. D. Burnell, Houston, Tex., asked what argument has been advanced that the arms should not be less than 15 in. from the pole.

Professor Richey said there were no good arguments. A reason given was that the standard construction was close to the side of the pole, and that if a cross-arm was placed parallel with the telephone cable and directly above the telephone cable, a man could ascend the telephone pole with perfect safety by swinging out on the other side on a quarter of the pole. At the last session of the joint committee the chairman of the committee climbed a pole arranged in that way, but all the wires were dead. He asked for comments when he got down, and one of the members told him that he did the job all right, except that he got killed four times in getting up to the top of the pole.

The secretary then read again the recommendation of the committee, which was adopted.

RUBBER-INSULATING COMPOUND AND CABLES

The subject of high-grade rubber-insulating compound was then placed before the association for discussion. F. R. Phillips, Pittsburgh, stated that there appeared to be some misunderstanding between the committee on power distribution and the committee on equipment that equipment engineers were interested in high-grade compound equipment, but that they were not particularly interested in drawing a specification for 30 per cent Para rubber. A committee recommendation of 1911 was reviewed by the committee on equipment, and it was satisfactory to it. The equipment committee and the equipment engineers were, however, interested in the probable specification for wires and cables for cars, and therefore the misunderstanding arose. The instructions to the committee on equipment were merely that they were to investigate high-grade rubber-insulating compound, in conjunction with the committee on power distribution, and that was all that was said. Mr. Phillips thought that the question of specifications for the insulating compound itself could be well left to the committee on power distribution, for the committee on equipment, although it was thoroughly capable of undertaking that work, would be satisfied if the matter was left to the committee on power distribution, the construction equipment, the amount of insulation and the amount of wire being of more interest to equipment men.

Mr. Palmer then read a communication from C. F. Woods, Pennsylvania Railroad, advocating co-operation with the three committees at present engaged on the work of rubber analysis and specifications and acting respectively for the steam railroads, the American Chemical Society and the American Society for Testing Materials.

H. H. Adams remarked that he thought the best way of disposing of it would be to leave the matter in the hands of the executive committee for final decision as to how this question should be handled, as applying to the two committees and that he concurred in the recommendation that it should be taken up by action of the executive committee.

On motion, duly seconded, the recommendation of the committee was then adopted.

The subject of standard stranding tables was then brought up for discussion. H. H. Adams stated that the committee on standards had approved this particular recommendation of the committee, and if it should be approved by the association in convention it would then be forwarded to the executive committee of the American Association in the usual manner. The recommendation of the committee was then adopted.

In connection with the subject of cables, next discussed, H. H. Adams stated that the committee on standards had referred this subject back to the committee on power distribution, in order that the working table might be complete. Since it has been completed, if the association should adopt this recommendation, it would then go back to the committee on standards for its action, which would undoubtedly be one of approval. The recommendation of the committee was then approved.

TROLLEY GUARDS

The next subject to be discussed by the association was that of trolley guards, and Mr. Adams advised the association that the committee on standards did not approve this recommendation of the committee on power distribution. It was not the subject for a recommendation of the committee on standards.

W. V. Burnell, superintendent of construction Stone & Webster Engineering Corporation, said that twenty or thirty of these crossings has been installed in Houston, Tex., during the last two or three years, and thus far they had had but one objection. This was the fact that the considerable weight of these trolley guards caused the trolley to lower gradually and sometimes reduced the clearance to less than the required 22 ft. On the other hand, the 22-ft. clearance required by the railroads over whose tracks the line crossed made it very difficult in some cases for the trolley poles to reach the trolley. A little defect in the trolley bases would very often cause the trolley to go off the wire, and it was found that the introduction of the trolley guard reduced the trouble to a very great extent. There had not been any cases of collapse, and in Houston it was considered very successful, and therefore, Mr. Burnell thought that the recommendations of the committee should not be adopted.

Wilson K. Page, electrical engineer Western New York & Pennsylvania Traction Company, stated that it must be granted that where the track and wire are in perfect line the necessity of a trolley guard became very much reduced but not done away with, for quite frequently the trolley wire would jump on the straight line with no apparent cause. It seemed to be commonly understood that, owing to the creeping of the rails in the steam railroad, it was very difficult, if not practically impossible, to maintain a perfect alignment of track. This creeping was caused by the expansion by heat, and on double-track roads, where trains run in but one direction on each track, the rails would creep in the direction of the traffic. This would throw one crossing frog one way and the other in the opposite direction, and, therefore, a car in crossing would be caused to sway. The trolley wire being higher on the crossing than on any other part of the system, the trolley pole would be nearer to the vertical, the tension would be less, and therefore a slight swaying of the car would cause the wheel to leave the car. It was also not an uncommon occurrence for a trolley base to become dry, so that it would swing hard, and the more nearly vertical the pole, the greater the force that had to be applied to swing the pole. As to the extra hazard, due to the increased number of wires at the crossing, Mr. Page agreed with the committee that the number of wires should be reduced as much as possible. The committee recommended, however, in its report that on spans under certain condition catenary construction should be used. By the installation of a suitable trolley guard he saw no reason why it should not be possible to secure a construction equivalent to the catenary, the only difference being the addition of a guard. Mr. Page stated further that any disadvantages that there might be in installing the guard were more than made up by the advantages received from its use. He felt himself supported in this statement by the Railway Commissions in every state, and particularly in New York, Ohio, Wisconsin and Michigan. Within the last few months the Baltimore & Ohio Railroad Company appointed a special committee to investigate the subject of the protection to trolley cars crossing steam railroads at grade. The committee went so far as to get out a set of standard draw-

ings for the installation of a suitable trolley guard. This same question was taken up by the Michigan Central and various other steam roads, all of which decided that the advantages gained by the use of the guard had been of great value in preventing accidents. It appeared that the committee found no fault with the operation of the guard, merely with the extra hazard which it believed to be introduced by its use.

In conclusion, Mr. Page said that it might not be a common occurrence for the trolley to jump at the steam railroad crossing, but he believed there was no one who could say that it never did jump, and it was for protection at such time that the guard was installed. It had been his experience that, regardless of the efficiency of the device, the mere fact that a company had taken steps to guard against accidents had great weight with a judge or a jury deciding an accident claim.

G. W. Palmer opposed the use of trolley guards, stating that the Public Service Commission of Massachusetts was often held up as a model commission of its kind and had under its inspection constantly the steam railroad crossings, yet there never had been a request to his knowledge from the State Commission of Massachusetts to have any one of these guards installed, and there certainly had not been a request made on his company, which operated 1000 miles of track with some thirty or forty crossings at grade.

Gaylord Thompson, chief engineer Ohio Electric Railway, stated that his company had been solicited by different railroads to put up trolley guards at the grade crossings and had persistently refused to do so, believing that the hazards added by such a construction outbalanced any possible benefits. In the State of Ohio there was a statute which prohibited the construction of any wire other than the simple trolley wire closer than 21 ft. to the track. All other wires, except the trolley contact wires, had to be not less than 25 ft., so that it appeared that the construction of such a device in Ohio would be contrary to law.

The danger of the dewiring of the trolley pole at railway crossings had been found to be greater with single-truck cars than with double-truck cars. Unless the track was badly out of line there was very little danger of dewiring due to the bad condition of crossing frogs, and it would be much safer and better if it were insisted that the crossing tracks be kept in good shape, good line and good surface, not only to prevent the dewiring of the trolley pole, but possibly the jumping of the cars at these crossings and their derailment.

Mr. Thompson did not know personally of any trouble with the overhead trolley guard, but understood from the experience of his company in Cincinnati that they had not been satisfactory, that they wore out, become loosened and dropped down, sagged below the regular clearance, and sometimes were torn down by the railroads as parts of their equipment might come in contact with them and make trouble. Since most interurban cars were equipped with trolley retrievers, if the trolley pole became dewired it was immediately held down by the retrievers. Consequently the guard would not serve the purpose for which it was designed, and for interurban service there appeared no excuse at all for the existence of a device of that sort.

William Roberts called attention to the wording of the recommendation, which was that: "Trolley guards should not be used, except possibly in unusual cases due to complicated alignment of the crossing track." The speaker said he had been interested in what Mr. Thompson had said, but that the Railway Commission of Ohio was now compelling the companies to put trolley guards on all classes of service. Of course, the thing needed was co-operation between the steam railways and the electric railways in keeping the tracks and overhead construction at crossings in the best possible condition, and he did not think that trolley guards could be dispensed with at all crossings. If it were possible to keep everything in good condition a trolley guard might not be necessary, but where a trolley guard could be put in which was not materially affected by the locomotive discharge, or was not injuriously affected by snow and sleet, he thought that they could be satisfactorily used.

Mr. Thompson thought it well to allow the railroad commissions to take the responsibility of ordering the crossings to be installed.

W. M. Archibald, Houston, Tex., said that in that city was one guard over 300 ft. long, which crosses about eight tracks in one of the yards of the Southern Pacific Company. It had been installed a little more than three years and its total maintenance had cost less than $50 in that time. The height of the trolley has been inspected regularly once in two months and during three years the guard was found once to be 1 in. below the standard but never lower. His company was equipping every railroad crossing which it had with trolley guards as fast as possible, and the effect on the general public was good. The public realized that a grade crossing of a steam railroad with an electric road was a serious hazard. The conditions in Houston were severe as there are about 70 or 75 miles of track with fifty-nine crossings.

Mr. Burnell said the cost of trolley guards was about $3 a foot, and on single-track crossing it was not necessary to install over 100 ft.

Mr. Schreiber calculated that the cost of a 300-ft. trolley guard would be $900, and if it lasted ten years an annual charge would be $90 in addition to the maintenance charge.

W. M. Archibald, engineer maintenance of way, Houston, thought the guard should last more than ten years as it was made of copper.

Wilson K. Page announced that the Chicago City Railway had one of these guards in use at the Thirty-fifth Street crossing of one of its lines, where it could be inspected.

The president put the motion to vote and nine were recorded in its favor and nine against.

The president declared the vote to be a tie and suggested that the subject be referred back to the committee on power distribution. Upon motion this was done.

The next subject discussed was the revision of specifications for high-tension, three-conductor, paper-insulated, lead-covered cables. The committee's recommendation was that no further revision be made of these specifications. This was carried.

The same action was taken upon the committee's recommendations for the revision of specifications for single-conductor, paper-insulated, lead-covered cable for 1200 volts, with its specifications for trolley wire, its recommendations for standard sections of grooved trolley wire, for standard line material and construction and for electric wire and cable terminology.

A special vote of thanks was then given to the committee on power distribution for its report.

On motion the meeting then adjourned.

The Duff Manufacturing Company, of Pittsburgh, has on exhibition representative sizes of the different types of lifting jacks manufactured, which include jacks with capacities from 1500 lb. to 500 tons. Many types are exhibited which are used exclusively for track work. The most important part of the exhibit is the new emergency car jack, "No. 239, Bay State," which is especially designed for the car equipment of a majority of the Massachusetts roads. This jack is designed with a number of novel features. It is equipped with a forged-steel claw mounted on a ball and socket joint which permits of the jack being placed and operated at any angle or in close quarters where ordinary jacks could not be applied. This claw permits of the jack being used to push the derailed car back onto the track, as the car can be both lifted vertically and shoved horizontally. The jack is constructed throughout with special determined material, the working parts being drop forgings and the main parts being manufactured from chrome nickel steel.

REPORT OF THE COMMITTEE ON UNIFORM DEFINITIONS*

BY M. C. BRUSH, CHAIRMAN; W. C. CALLAGHAN, I. H. MCEWEN AND A. BENHAM

This committee was appointed by President Shannahan in accordance with a resolution passed by the executive committee during the period of the midyear meeting in New York in January. The resolution provided "that a committee be appointed to define terms commonly used in the transportation departments of electric railways and that subsequently an effort be made to bring about the uniform adoption of such definitions with a view to standardization."

The committee held its initial meeting in New York during the period of the midyear meeting and discussed tentative outlines for the work. Certain definite work was allotted to the members and some progress has been made with that during the balance of the year. It was felt to be necessary to define the work allotted to the committee a little more closely than was possible in the general terms of the resolution passed by the executive committee. With this purpose in mind, correspondence was entered into with the executive officers of the association and the members of the executive committee who were especially instrumental in offering or urging the adoption of the resolution under which the committee was appointed. With this correspondence as a basis and after further consideration by individual members of the committee, it was decided that it would be necessary to take up for definition terms used in both urban and interurban railway systems and to secure a representation on the committee not only of companies engaged in these different classes of service but also of companies located in somewhat different sections of the country, in order that terms of particular local significance might be brought to the attention of the committee. When a suggestion that the committee be increased was made by your chairman to the president of your association, another member was appointed.

The committee has compiled lists of terms in common use in the transportation departments of large city and interurban systems. It is apparent from the extent to which this work has already been carried that there is a real need of standardization of terms, not only with different companies and in different localities of the country, but also in the same company, where conflicting terms are sometimes used to express the same meaning. Some of these terms are slang phrases adopted by trainmen or others in the service of the company, while others are the terms that have been prescribed or adopted as the best available without thought of possible conflict with standards prevailing elsewhere. These conditions make it important for the committee to undertake as thorough a canvass as is practicable, in order to judge the sentiment of the various member companies in regard to the application of standard terms. The committee was unable to continue far enough with its work during the current year to do this satisfactorily and thoroughly, and for that reason it asks to be continued for another year.

Definitions of terms in use in the transportation department will be of value to member companies if they are thoroughly representative of standard practices on the various lines and are, therefore, adaptable immediately and appropriately to practically existing conditions. Such definitions will not be acceptable to the companies if they fail to recognize the varying requirements of the companies. The committee, however, believes that a certain number of terms can be standardized without a serious disarrangement of existing practices and that this should be done. Its plan is to offer a number of definitions for action at the next annual convention if it shall be the pleasure of the association to give it authority to continue this work for another year.

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Chicago, Ill., Oct. 7-11, 1912.

FREAK ORDINANCE

The Philadelphia Rapid Transit Company recently received a letter proposing that the ordinance printed below should be passed by the Common Council of that city. A copy of the "ordinance" also was sent Mayor Blankenburg, a director of the company ex officio. The joke ordinance follows:

"AN ORDINANCE TO REGULATE THE CAR SERVICE OF THE PHILADELPHIA RAPID TRANSIT COMPANY.

"Section 1. Be it ordained that from and after the date of the passage of this ordinance all the cars of the Philadelphia Rapid Transit Company shall make alternate stops at the near and far sides of all street crossings as shall be further directed in the following sections:

"Section 2. For the time intervening between the odd and even hours all cars shall stop on the near side and from the even to the odd hour cars will stop on the far side.

"Section 3. When the near-side stop is made all male passengers will enter the car by the front entrance and leave by the rear exit. All female passengers will use the rear entrance and the front exit at this time. When the far-side stop is made all male passengers will enter the car by the rear entrance and leave by the front exit. All female passengers will use the front entrance and rear exit at this time.

"Section 4. Children will be allowed only at the hour corresponding to their age. For example, a child of five years may ride from 5 to 6 o'clock, a child of twelve years from 12 to 1 o'clock and at no other time.

"Section 5. The Philadelphia Rapid Transit Company shall be required to furnish and install at its own expense within thirty days from the passage of this ordinance speed regulators on all its cars for the use of each and every passenger. This device shall be located conveniently within the reach of said passenger so that he or she may be able to stop, start or change the speed of the car at his or her convenience or desire.

"Section 6. And it is further ordained that nothing in this ordinance or any section thereof shall be so construed as to require or enforce the payment of fare, either in cash, its equivalent or any substitute therefor, to the Philadelphia Rapid Transit Company by any passenger of either sex or any age if it can possibly be avoided by said passenger, and any act, endeavor or effort on the part of any official, agent, employee or representative of the company to demand, force, coerce, extort, compel, exact, claim, cajole, solicit, entreat, induce, beg, beseech, supplicate, request, petition, require, ask, desire, obtain, take, collect or receive the payment of fare shall be deemed a violation of this section and ordinance.

"Section 7. The Philadelphia Rapid Transit Company shall, however, as heretofore, retain all right, title, interest and equity in all the properties now owned, leased, controlled or managed by it or subsidiary companies located in the city of Philadelphia, the state of Pennsylvania and elsewhere.

"Section 8. The state of Pennsylvania hereby guarantees to the bondholders and stockholders of the Philadelphia Rapid Transit Company payments of dividends and interests on the mortgage bonds and common and preferred stock of the said corporation."

The Speer Carbon Company, St. Marys, Pa., is showing a full line of carbon brushes. This company is just introducing its new metallic brush for low voltage machines. It is manufactured from a composition of copper and graphite which increases its conductivity and abrasive qualities.

MONDAY'S SESSION OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

President Shannahan called the first meeting of the Transportation & Traffic Association to order at 2:45 yesterday afternoon and delivered his annual address. This is published on another page in this issue. He then called for the report of the secretary and treasurer. This is published on another page. The report of the executive committee was then presented. It consisted of the minutes of the meeting of the committee. The report of H. C. Donecker as secretary and treasurer was then presented. It appears elsewhere in this issue.

President Shannahan then announced the applications of 106 new members. The total number, he said, now was 350.

The president then called for a report of the committee on city rules. It was presented by E. F. Peck and is published elsewhere in this issue.

APPOINTMENT OF NOMINATING COMMITTEE

The president then announced the appointment of the following nominating committee: E. C. Faber, chairman; L. S. Bradley and E. F. Peck.

REPORT OF THE COMMITTEE ON SUBJECTS

President Shannahan then asked Mr. Faber to present the report of the committee on subjects. Mr. Faber presented his report verbally. It was his belief that the work of this committee could better be performed by the executive committee, and he asked that the committee be abolished. Upon motion this was done.

REPORT ON CITY RULES

President Shannahan called attention to one suggestion made by the committee; it was desired to have the association determine whether it wished to adopt city rule No. 32 or interurban rule No. 183. The report called attention to the conflict between these two rules.

C. D. Emmons, Fort Wayne, Ind., said that the reason why rule No. 183 was worded as it was in the interurban rule book was that this was the state law of Indiana. One objection to the old rule was that the motorman was not permitted to cross the steam railroad track if a train was seen to be approaching and was about to cross. The train might be seen approaching 10 miles away, and a man ought to be permitted to use his judgment as to whether it was far enough away to allow the car to cross before its arrival. Hence the rule was retained to read exactly like the law. He did not think the elimination of the requirement that the motorman should look back was a good one because there were a great many interurban cars so arranged that it was perfectly possible and proper for the motorman to glance back at the rear to see if some passenger was getting on or off.

C. Loomis Allen, Syracuse, made a motion that rule No. 32 be adopted in place of rule No. 183.

President Shannahan said that he thought the city men preferred rule No. 32 in both codes, but that the interurban companies in that case might not follow this recommendation. As there might be at the meeting a larger number of city men than interurban men, he suggested that two votes be taken, one by the city men present, the other by the interurban men present. This would give a consensus of opinion.

A member moved that the motion be amended so that the section in rule No. 183 giving instructions in regard to signals be incorporated in rule No. 32. Mr. Allen accepted the amendment. This motion was carried.

W. C. Callaghan said that in the city rule book at the present time, under the heading of "Signals Between Motormen and Conductors," one bell was given as the signal from the motorman to the conductor to come forward. While that might be necessary in interurban operation, this would be bad practice in city operation, where the effort is to keep motormen and conductors separated, and the motorman attending to the operation of his car instead of talking to the conductor.

W. B. Rockwell, Pottsville, Pa., asked about the single-end car, where both motorman and conductor are on the same end.

Mr. Callaghan said that that was the largest objection to this type of car.

Mr. Rockwell said that it is necessary frequently for the motorman to speak to the conductor; it was not to be supposed that the conductor would stay on the front platform all day.

Mr. Callaghan said that the report referred to the rule that no persons shall be permitted to board the car at the front platforms of prepayment cars. That does not apply to near-side cars and makes no provision for an operating official such as an inspector. It does not take into account the fact that cars may be boarded at other places than the regular stopping places, as, for instance, when a conductor might board a car after flagging a railroad crossing.

E. F. Peck, Schenectady, N. Y., said that the committee made no recommendations on this; it simply outlined the different rules in use on other roads and dealt specifically with rules that had already been adopted. It made no recommendation, but suggested that the matter be discussed and that any additional rules or changes desired be made at this meeting.

Matthew C. Brush, Boston, Mass., said that on the Boston Elevated Railway, employees were permitted to board cars on the front platform and that at terminals passengers were permitted to board at either end.

Mr. Brush said that it would facilitate loading the cars to word the rule so as to permit passengers to board cars at the forward end at terminals where they had already paid their fares.

J. V. Sullivan, Chicago, Ill., said that in Chicago there was a rule providing that uniformed employees, policemen and mail carriers could board at the front end. That helped to distribute the passengers and left the rear of the car open to regular paying passengers.

D. A. Hegarty, New Orleans, La., asked what should be done about the near-side cars when such a rule existed. In view of changes in the cars, he did not see how such a rule could be obeyed at all. In some cities colored passengers boarded cars at the front end and white passengers at the rear end.

Mr. Peck, explaining the situation on this subject, said that at the last convention of the association certain rules were recommended for prepayment cars. At that time the different types of cars were being developed so rapidly that it did not seem possible to reconcile some of the rules with the different conditions that were confronting the committee. At the present time the committee was still in the position in which it was last year, that there are so many different types of cars that it did not seem possible to adopt rules for prepayment or other types of cars of that kind, and it was therefore coming before the convention to have the entire matter discussed.

Mr. Allen moved that the resolution which was adopted on Oct. 7, 1909, Oct. 12, 1910, and Oct. 11, 1911, which was printed in the standard code and related to the reasons for compilation of the code, be re-adopted at this convention. The motion was seconded and carried.

Further discussion on the subject of the suggested rules took place.

C. D. Emmons, South Bend, Ind., then moved that all prepayment rules be referred back to the new committee on city rules, with the recommendation that an effort be made by the committee to report definitely to the convention of the following year.

After the motion was seconded, Mr. Brush asked if it would not be of value to the committee considering the

rules to have expressions of opinion on the part of the members of the association. He would like to take up the rules one at a time for discussion in order that the committee in making recommendation for the ensuing year might have the benefit of criticisms.

Mr. Emmons, therefore, withdrew his motion. Mr. Brush then moved that the variations in the prepayment rules be taken up one at a time and discussed by the convention. This motion was carried.

J. W. Brown, Newark, N. J., said that rule No. 350 read: "The conductor's position under all ordinary circumstances is at the rear in the place provided for him." In view of the rapidly changing position of the conductor in new types of cars, would it not be better to have the rule read: "The conductor's position under all ordinary circumstances is ———." The vacant space could be filled by reference to the center entrance, front platform or rear platform, according to the type of equipment used.

F. T. Wood, New York, N. Y., asked why that point could not be covered by the statement that the conductor's position except in extraordinary cases should be at the point of fare collection.

President Shannahan asked Mr. Peck, the chairman of the committee if it was the idea of the committee that a rule could be framed that could be made standard.

Mr. Peck said that the committee was of the opinion when it considered the matter that it would be impossible to adapt rules to different types of cars unless each type should be taken up separately.

D. A. Hegarty, New Orleans, La., thought that a rule could be formulated that would govern all types of cars of the various companies if the words "at the rear" were eliminated.

M. Badgero, Syracuse, N. Y., thought that the reference to platform in rule No. 353 should be eliminated.

Mr. Hegarty suggested that by the substitution of "exit" for "rear end" in rule No. 355, the rule could be made applicable to different types of cars.

Mr. Brush pointed out that this rule as drafted included the words "on the platform," which made it inapplicable to cars of the center-entrance type.

Mr. Hegarty thought that rule No. 41 of the city code covered the point about the discharge of passengers from cars better than rule No. 355 as drafted.

J. W. Brown suggested that rule No. 377 as drafted might be changed to read "No pay passengers shall be permitted to board the car except at the entrance in charge of the conductor."

Mr. Brush thought that to cover another exception the rule should read, "All pay passengers shall enter the car at the prescribed location of the conductor except at prepayment terminals."

W. C. Callaghan asked why in rule No. 376 provision was made for exit doors on the front platform only and no provision was made for rules of a similar character for rear doors where such doors were placed on cars.

Some discussion then took place as to the advantage of the requirement that persons should be prevented from going to the front end of the car. Mr. Brush suggested that the criticisms might be met by the adoption of a rule reading as follows: "All pay passengers shall enter the car at the prescribed location of the conductor, except at prepayment terminals."

It was also suggested that this revision would not make the rule apply to lines on which two fares were collected.

C. D. Emmons moved that the question of a prepayment rule be referred back to the committee on city rules with instructions to endeavor to make a definite report on this subject to the 1913 convention. He thought that it would be well if at least five members of the rule committee were men operating prepayment cars so that the association would have the benefit of full experience in this matter. The motion was carried.

REPORT OF COMMITTEE ON INTERURBAN RULES

The report of the committee on interurban rules was read by W. H. Collins, Gloversville, N. Y. An abstract of this report is published elsewhere in this issue.

President Shannahan called attention to the recommendation that rules No. 197 and 377 be discussed on the floor.

Upon motion city rule No. 197 was then adopted as one of the rules of the interurban code in place of rule No. 377. The next rule in the interurban code which the committee suggested should be changed was rule No. 92 (c). This was changed as recommended by the committee to make the rule conform to the illustration in the back of the book.

By vote rule No. 149 was then changed to provide that one torpedo should be placed on the rail of the engineer's side of the cab, instead of two torpedoes, one on each side. The changes recommended by the committee in rules Nos. 159 and 172 were also adopted. Upon motion of Mr. Emmons the changes recommended in rule No. 218 were adopted with the addition of the words "or clearance from the dispatcher" after the words "train order" at the end of the first paragraph.

The changes recommended in rule No. 229 were approved. Finally the adoption of the code as recommended by the committee was approved by the association for submission to the American Association in the same language as that used at the 1909 convention.

REPORT ON UNIFORM DEFINITIONS

This report was read by Mr. Brush, the chairman, and was adopted. The report is published elsewhere in this edition.

Upon motion the meeting then adjourned.

SAN FRANCISCO INVITATION FOR 1915

The association has received a cordial invitation to hold its annual convention in 1915 at San Francisco. The invitation comes from the Panama-Pacific International Exposition, whose officers have delegated five gentlemen well known in electric railway circles, W. W. Briggs of San Francisco, J. McMillan of Los Angeles, F. W. Frost of Oakland, H. A. Lardner of San Francisco and Thomas Finnegan of San Francisco, to extend the invitation before the association. The invitation, addressed to the president, follows:

"The Panama-Pacific International Exposition
"San Francisco, Cal.
"Office of the President.
"Sept. 27, 1912.

"Dear Sir—The Congress of the United States, with the approval of the President, has selected San Francisco as the place for celebrating the world's greatest physical achievement—the completion of the Panama Canal. Here in 1915 the nations of the world will assemble, not merely representing their most important, valuable and interesting productions, but in a series of congresses which are intended to be the most important the world has ever known. These are intended to bring here the most noted thinkers and publicists of the world, men of all nations of broadest intellectual grasp of world affairs.

"It is therefore a matter of unusual consequence that the important convention to be held that year by your body should choose San Francisco as its meeting place. We have delegated Messrs. W. W. Briggs of San Francisco, J. McMillan of Los Angeles, F. W. Frost of Oakland, H. A. Lardner of San Francisco and Thomas Finnegan of San Francisco to appear before your convention at Chicago as representatives of the president of the Panama-Pacific Universal Exposition, to extend in his name to the members of your convention an invitation on behalf of the exposition.

"We ask for them the courtesy of a hearing and earnestly hope that the sentiment of the convention will be in favor of holding its 1915 meeting in San Francisco. Very truly yours,

[Signed] "Charles C. Moore,
"President."

REPORT OF THE COMMITTEE ON POWER DISTRIBUTION*

BY G. W. PALMER, JR., CHAIRMAN; A. S. RICHEY, VICE-CHAIRMAN; GAYLORD THOMPSON, C. R. HARTE, L. C. CABLE, EDWARD HAYDON, WILLIAM ROBERTS, J. H. BARNARD AND JOHN W. CORNING

The executive committee of the American Electric Railway Engineering Association assigned to the committee on power distribution the following subjects for consideration this year:

1. Specifications for the joint use of poles.
2. Specifications for overhead crossings of trolley contact wires over railway tracks.
3. Specifications for overhead crossings of foreign wires with electric railway wires.
4. Concrete lattice and tubular poles, including settings for iron poles.
5. High-grade rubber insulating compound.
6. Standard stranding table.
7. Revision of the copper wire table, now a standard of the association.
8. Trolley guards.

Shortly after the 1911 convention, the committee on standards referred the following subjects to the executive committee with the request that they be called to the attention of this year's committee on power distribution:

1. Revision of specifications for high-tension three-conductor paper-insulated, lead-covered cable.
2. Revision of specifications for single-conductor paper-insulated, lead-covered cable for 1,200 volts.
3. Revision of specifications for overhead crossings of electric light and power transmission lines.

At the last convention, there was evident a desire that the specifications for No. 00 round hard-drawn copper trolley wire, recommended by the committee for adoption as "standard," and so adopted and referred to the committee on standards, and the specifications of the American Society for Testing Materials for hard-drawn copper wire, be made to harmonize if possible, through joint action by the committee on power distribution and a committee from the American Society for Testing Materials. This subject, therefore, has been so jointly considered.

SPECIFICATIONS FOR THE JOINT USE OF POLES

(Under this head the report discusses previous conferences on this subject with representatives of other public service companies at which members of this committee were present. On Jan. 25, however, at a meeting of the executive committee of the American Electric Railway Association, the chairman was instructed to appoint a committee to be known as the joint pole committee, to review the whole subject of the joint use of poles. W. J. Harvie was appointed chairman of this committee and the committee on power distribution received representation on it through its vice-chairman, Prof. A. S. Richey. The committee on power distribution therefore recommends that it be discharged from further consideration of this subject, except at the request of the joint pole committee.)

SPECIFICATIONS FOR OVERHEAD CROSSINGS OF TROLLEY CONTACT WIRES OVER RAILWAY TRACKS

At the meeting on May 23 and 24, the tentative specifications, overhead crossings of trolley contact wires over railway tracks, adopted by last year's committee, were thoroughly reviewed and in some respects revised, but it was decided that this matter should not be taken up with the other parties at interest until the policy of the American Electric Railway Association in connection with this and other kindred subjects should be developed. The reasons for this are more fully set forth in the discussion of the subject "Specifications for Overhead Crossings of Electric Light and Power Transmission Lines."

The specifications, as shown in Appendix A of this report, are given with a view to developing discussion and comments of benefit to the committee in a further consideration of this subject.

SPECIFICATIONS FOR OVERHEAD CROSSINGS OF FOREIGN WIRES WITH ELECTRIC RAILWAY WIRES

At a meeting of May 23 and 24, the specifications for overhead crossings of foreign wires with electric railway wires adopted by last year's committee were thoroughly reviewed, and in some respects revised. It was decided, however, that this matter should not be taken up with the other parties at interest until the policy of the American Electric Railway Association in connection with this and other related subjects should be developed.

The reasons for this are more fully set forth in the discussion of the subject "Specifications for Overhead Crossings of Electric Light and Power Transmission Lines."

The specifications (Appendix B of this report) are given with a view to bringing out discussion and comments of benefit to the committee in a further consideration of this subject.

CONCRETE, LATTICE AND TUBULAR POLES, INCLUDING SETTINGS FOR IRON POLES

The committee regrets that at this time its investigation of this subject has not reached a point that will permit it to submit a final report. It hopes, however, at the next convention, to be able to recommend standard specifications for concrete, tubular and perhaps lattice poles, suitable for the most common uses of such structures.

HIGH-GRADE RUBBER-INSULATING COMPOUND

At the last convention, the committee submitted specifications for 30 per cent Para rubber compound and recommended its adoption as standard. As it appeared in the subsequent discussion that the committee on equipment was strongly interested in the subject of rubber insulation, the association referred the subject back to the committee on power distribution and instructed that it be taken up in conjunction with the committee on equipment for report to the 1912 convention.

On Jan. 12 the chairman wrote the chairman of the committee on equipment, requesting that he appoint a sub-committee to act with the sub-committee of the committee on power distribution with a view to considering this subject at a joint meeting to be held on Jan. 26, in New York. Messrs. Patterson, Clark and Blar formed the sub-committee of the committee on equipment and Messrs. Corning, Thompson and Barnard, the sub-committee of the committee on power distribution. Owing to the illness of Mr. Corning, the sub-committee of the committee on equipment was requested to take the initiative in the further consideration of this matter.

From the minutes of the June 14 meeting of the committee on equipment on this subject, it appeared that the question having been raised as to whether the cost of this high-grade insulation would justify its use in the equipment of rolling stock, the committee on equipment felt that the subject was deserving of much more investigation and consideration than could be given under present instructions, and recommended that the subject of specifications for wires and cables for equipment purposes, including the quality of insulation and construction of wires and cables for different voltages and carrying capacities, be assigned to that committee for the coming year.

It appears from the foregoing that no progress has been made in the matter of specifications for high-grade rubber compound, and that we are at the same point on this subject as we were at the 1911 convention.

The committee on power distribution at that time had a definite specification, which it recommended for adoption, but action was deferred in order that the committee should work in conjunction with the committee on equipment on this particular specification. The committee feels that the attempt to develop a standard specification for 30 per cent rubber compound should not be delayed by the doubtless desirable at-

*Abstract of report read before the American Electric Railway Engineering Association, at Chicago, Ill., Oct. 7-11, 1912.

tempt generally to standardize the specifications for wires and cables for equipment purposes. A standard insulation of this grade is strongly needed for power distribution purposes, there being but comparatively small use for other grades of rubber insulation for similar purposes.

The committee therefore recommends that it be authorized to continue its consideration of this grade of insulation, in order that it may submit to the 1913 convention standard specifications for various sizes and kinds of wire and cable, insulated with this grade of compound. If the committee on equipment is interested in this particular grade of compound, the committee on power distribution would be glad to consider the subject jointly. As lengthy consideration will be necessary, the desirability of prompt action is suggested.

STANDARD STRANDING TABLE

At the last convention the committee reported that it had taken up the matter of a "standard" stranding table for all sizes of cable, but stated that it had been unable to reach a definite conclusion on the matter and that as the standards committee of the American Institute of Electrical Engineers had the subject of a standard stranding table under consideration, the committee felt that action by the association should be deferred until definite action had been taken by the American Institute of Electrical Engineers.

The Bureau of Standards of the United States Department of Commerce and Labor in its Circular No. 31, published April 1, 1912, gives the properties of bare concentric cables of standard annealed copper in both standard strands and flexible strands, English and metric units. These tables are in accord with the standards adopted by the standards committee of the American Institute of Electrical Engineers, in respect to the number of wires both in standard strands and in flexible strands and also with regard to the correction for increase of resistance and mass due to the twist of the wires.

The committee has recommended in its report to the committee on standards that Table IV (not reproduced), which is based upon the above-named tables, be adopted by the association as "standard."

REVISION OF THE COPPER WIRE TABLE, NOW A STANDARD OF THE ASSOCIATION

A new value for the standard resistivity of annealed copper has been adopted by the Bureau of Standards and the American Institute of Electrical Engineers, and has also been agreed upon at an international conference between representatives of the United States, Germany and France. The new value is to be known as the "annealed copper standard," and is equivalent to 0.15328 ohm (meter gram) at 20 deg. Cent.

Based upon the new standard, the following named tables have been prepared, which the committee recommends for adoption as standard, superseding the standard copper wire table adopted in 1910:

Table I—Complete copper wire table, in English units.

Table II—Complete copper wire table in metric units.

Table III—Working copper wire table, in English units.

Table IV—Table of bare concentric cables, in English units.

The committee also presents Table V, giving data for average commercial hard-drawn aluminum wire at 20 deg. Cent. of the American wire gage sizes. It is based on a figure furnished by the Aluminum Company of America as representing the mean conductivity of its output for all sizes of wire for five years past.

The committee has recommended in its report to the committee on standards that Tables I and II be adopted by the association as standard; also that an abbreviated table (Table III), based upon Tables I and II, be adopted by the association as a "standard" working table. Tables I, II, III, IV and V, hereinbefore mentioned, are given in full in Appendix C of this report. (Not reproduced.)

TROLLEY GUARDS

The committee is very strongly of the opinion that the additional hazard introduced by the use of trolley guards is not generally warranted by the benefit derived therefrom, and feels that as the cases where they can be used with any net benefit are exceptions to what it believes should be the general rule, trolley guards should not be used. It is the unanimous sentiment of the committee that the inherent dangers at railroad crossings are best minimized by simple and correct construction of the overhead line wires, and by maintaining the track in good line and surface.

The committee therefore has recommended in its report to the committee on standards that the following be adopted by the association as "recommended practice": "Trolley guards should not be used, except possibly in unusual cases due to complicated alignment of the crossing track."

REVISION OF THE COPPER WIRE TABLE, NOW A STANDARD OF THE PAPER-INSULATED, LEAD-COVERED CABLE

At the 1911 convention the committee on power distribution submitted a specification on this subject, recommending that it be adopted by the association as "standard." The specifications were approved by the association and referred to the committee on standards for adoption as "standard."

At the subsequent meeting of the committee on standards, in the discussion of this subject, the question was raised as to a possible element of doubt in some portions of the specifications, and it was decided to request the executive committee to ask the incoming committee on power distribution further to consider these specifications.

The committee on standards, by unanimous vote of the members present, then approved the specifications for adoption as "standard" and the matter therefore went to the letter ballot of the member companies of the association.

The committee has exhaustively considered the specifications and in its report to the committee on standards has recommended the following revision in specifications as printed in the proceedings of 1911:

Page 87, title, "Specifications for High-Tension, Three-Conductor, Paper-Insulated, Lead-Covered Cables," to be changed to "Specifications for High-Voltage, Three-Conductor, Paper-Insulated, Lead-Covered Cable."

Conductors: Strike out the words "Intermediate sizes take the stranding of the next larger listed size."

The paragraph, "Each of the individual wires shall have a conductivity of not less than 98.5 per cent of pure, soft copper by the standard adopted by the American Institute of Electrical Engineers," to be changed to "Each of the individual wires shall have a resistivity of not more than 888.55 ohms (mile pound) at 20 deg. C."

The paragraph as to stranding is unnecessary, as by the new stranding table the sizes of conductors quoted in the specifications have the same number of wires.

The conductivity prescribed by the specifications "98.5 per cent of pure soft copper by the standard adopted by the American Institute of Electrical Engineers" is in the revision expressed in specific instead of relative terms, and is the resistivity of copper corresponding to 98.5 per cent of the conducivity of the new annealed copper standard.

The committee recommends that no further revision be made in these specifications.

REVISION OF SPECIFICATIONS FOR SINGLE-CONDUCTOR, PAPER-INSULATED, LEAD-COVERED CABLE FOR 1,200 VOLTS

At the 1911 convention, the committee submitted specifications on this subject, recommending that it be adopted by the association as "standard." The specifications were approved and referred to the committee on standards for adoption as "standard."

At the subsequent meeting of the committee on standards, in the discussion of this subject, the question was raised as to a possible element of doubt in some portions of the specifications, and it was decided to request the executive committee to ask the incoming committee on power distribution further to consider these specifications.

The committee on standards, by unanimous vote of the members present, then approved the specifications for adoption as

"standard," and the matter therefore went to the letter ballot of the member companies of the association.

The committee has exhaustively considered the specifications, and in its report to the committee on standards, has recommended the following revisions in the specifications, as printed in the proceedings of 1911:

Page 93, conductor: The following stranding,

Size of Conductor	Number of Wires
1,100,000-1,900,000 circ mil.	91
2,000,000 circ. mil. and larger	127

to be changed to

Size of Conductor	Number of Wires
1,100,000-1,500,000 circ. mil.	91
1,600,000 circ. mil. and larger	127

in order that it accord with the proposed new "standard" stranding table.

That the paragraph "Each of the individual wires shall have a conductivity of not less than 98.5 per cent of pure soft copper by the standard adopted by the American Institute of Electrical Engineers" be changed to read, "Each of the individual wires shall have a resistivity of not more than 888.55 ohms (mile pound) at 20 deg. C." This resistivity corresponds to 98.5 per cent of the conductivity of the new annealed copper standard.

The committee recommends no further revisions of these specifications.

REVISION OF SPECIFICATIONS FOR OVERHEAD CROSSINGS OF ELECTRIC LIGHT AND POWER TRANSMISSION LINES

At the 1911 convention, the committee on power distribution submitted specifications on this subject, recommending that they be adopted by the association as "standard." The specifications were approved by the association and referred to the committee on standards for adoption as "standard."

(After reciting various objections raised by different public service interests, which prevented the issuance of the usual letter ballot, the committee asserts its belief that action on this matter should be taken only after careful consideration by the executive committee of the American Electric Railway Association with respect to the legal aspects of the case and its relation to municipalities and public service commissions, if the association should adopt these specfications as "recommended practice" or as "standard.")

In its report to the committee on standards, the committee recommended the following revision of these specifications as printed in the 1911 proceedings, and that it should have more time to investigate:

Page 112, the following paragraph:

"1. Scope: These specifications shall apply to overhead electric light and power line crossings (except trolley contact wires) over railroad right of way, tracks or lines of wires; and further these specifications shall apply to overhead electric light and power wires of over 5000 volts constant potential, crossing, or construction over telephone, telegraph or other similar lines."

To read,

"1. Scope: These specifications shall apply to overhead electric light and power line crossings (except trolley contact wires) over railroad right of way, tracks, or lines of wires."

Page 113, the following paragraph, under "Location:"

"5. The poles, or towers, supporting the crossing span, and the adjoining span on each side, preferably shall be in a straight line."

To read,

"5. The poles, or towers, supporting the crossing span, and the adjoining span on each side, preferably shall be in a straight line, and of such height that there shall be no lifting strain upon the supporting insulators."

On July 18 the committee was informed by Farley Osgood, chairman of the joint committee of the various interests that had considered this subject, that on May 15, 1912, the American Railway Association presented a report, through its committee on electrical working, in which these specifications were included in complete detail, and the same were approved at the convention and adopted by that association as "recommended practice." This action was taken, however, after a revision of the specifications, which the committee had not considered.

Your committee therefore now recommends that these specifications, as revised by it, be adopted by the association as "recommended practice," and that it be authorized to confer with the other parties in interest with a view to securing united action on the revision proposed by the committee and the other interests.

SPECIFICATIONS FOR TROLLEY WIRE

At the 1911 convention the committee submitted specifications for No. 00 round hard-drawn copper trolley wire, which were approved by the association and passed to the committee on standards. At the meeting of that committee shortly after the 1911 convention the specifications were approved for submission to letter ballot of the member companies for adoption as "standard."

For the purpose of harmonizing, if possible, these specifications and the specifications for hard-drawn copper wire of the American Society for Testing Materials the chairman appointed Messrs. Richey, Harte and C. F. Woods as a sub-committee to meet Messrs. Capp, Bassett and Tinsley, a sub-committee of the American Society for Testing Materials.

The most important difference between the specifications of the respective associations had been in relation to the inclusion of a torsion test. Representatives of the American Society for Testing Materials had previously claimed that the torsion test was worthless, in that it was not in any manner a gage of the performance of the material, that it had long since been abandoned by the American Telephone & Telegraph Company as a test for hard-drawn copper wire, and that it would not disclose any faults or defects which would not be disclosed by the other tests prescribed in their specifications.

On the other hand, the committee on power distribution was certain, from the experience of its members and that of other member companies, that the torsion test was distinctly a gage of the uniform condition of the material, that it would and did disclose seams and other defects which would not otherwise be shown, and therefore included the torsion test in the committee's specifications. It believed that the performance required of and the usage given the trolley wire differed so materially from that of the wire used for ordinary suspension and conducting purposes that it required a different material and one which would pass a more stringent test than that ordinarily used in connection with hard-drawn copper wire.

At the joint meeting the representatives of the American Society for Testing Materials stated that they were now prepared to admit that the torsion test would disclose defects which would not be disclosed in any other manner, nor by the tests prescribed in their specifications, but questioned whether the number of turns prescribed by the torsion test of the committee's specifications were not greater than the number required. In discussion which followed, no agreement was reached as to the number of turns which should be prescribed. At the last meeting of the joint sub-committee, held in New York July 19, there was outlined the procedure to be taken in the further investigation of this subject. The committee at this time therefore recommends no revision of these specifications.

STANDARD SECTIONS OF GROOVED TROLLEY WIRE

A section of No. 0000 grooved trolley wire was approved as "standard" at the 1909 convention. Sections of No. 00 and No. 000 sizes were approved at the 1911 convention and passed to the committee on standards. At the subsequent meeting of the committee on standards these sections were approved for submission to letter ballot of the member companies for adoption as "standard."

Since the convention it has transpired that the drawings showing the sections have been interpreted by different parties in different ways, and a discussion as to their interpretation has arisen between the manufacturers of copper wire represented on the committee of the American Society for Testing Materials.

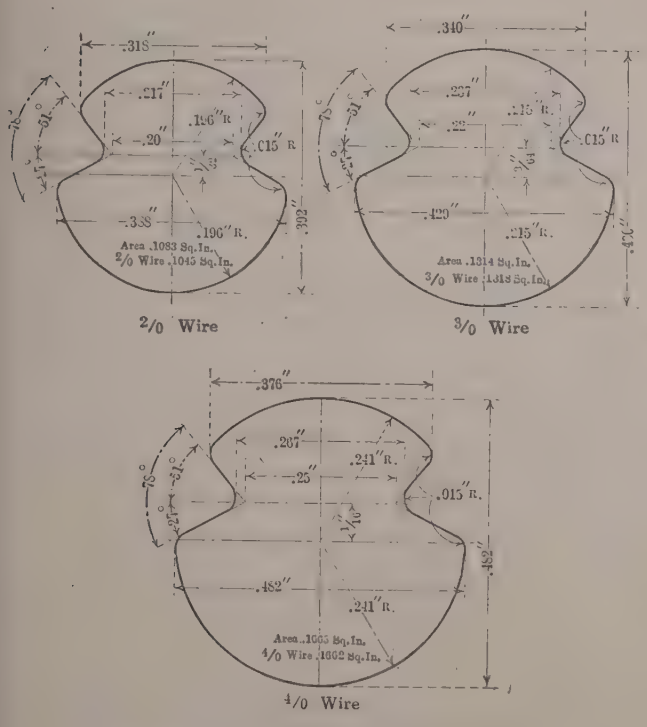
It appears that varying interpretations by the different manufacturers have resulted in placing on the market slightly differing sections of trolley wire, each being claimed to be in accordance with the association standard. The committee realizes that the drawings submitted in previous reports were too small to allow a definite and uniform interpretation of the same, and in its report to the committee on standards has herefore recommended that the present standard drawings be revised, as shown by the drawing submitted herewith.

The American Society for Testing Materials, which had adopted the sections as shown in the committee's previous reports, stands ready, we are informed, to follow our interpretation of these drawings.

In the sections as shown in this report no change has been made from the sections intended to be shown by the drawings in the previous reports quoted.

STANDARD LINE MATERIAL AND CONSTRUCTION

The committee is pursuing its investigation of this subject, with a view to submitting definite standard specifications later, covering the various kinds of materials and construction generally used. The matter is in the hands of a sub-committee, Messrs. Harte, Cadle and Hayden. The committee regrets that



Standard Grooved Trolley Wire Sections

it cannot report more fully on this subject at this time, although a great amount of work has been done and the matter is well in hand.

It submits, however, as an indication of progress in this direction, the following: "Specifications for Galvanizing on Iron and Steel" (Appendix D, not reproduced), which it recommends for adoption by the association as "standard." These specifications are practically the same as those included in the specifications for high-tension overhead crossings already acted on by the association and which, it will be remembered, were included in the joint report of the committee on overhead line construction of the National Electric Light Association, the high-tension committee of the American Institute of Electrical Engineers, the committee on power distribution of the American Electric Railway Engineering Association, the committee on high-tension wire crossings of the Association of Railway Telegraph Superintendents and the sub-committee of the committee on electricity of the American Railway Engineering Association.

PROPOSED SPECIFICATIONS

The committee includes in Appendix E (reproduced in part) as a part of its report several specifications that have been in successful use for the purchase of material. They are herewith submitted for constructive criticism and comment, with a view to their submission next year in such revised form as may be necessary to enable the committee to recommend them for adoption as "standard." Any comments or criticisms will be welcomed by the committee, and it further earnestly requests that they be submitted in writing not later than Jan. 1, 1913.

ELECTRIC WIRE AND CABLE TERMINOLOGY

(The committee also submitted sixteen electric wire and cable terms (Appendix F, not reproduced) as approved by the Bureau of Standards and the American Institute of Electrical Engineers.)

APPENDIX A

SPECIFICATIONS FOR OVERHEAD CROSSINGS OF TROLLEY CONTACT WIRES OVER RAILWAY TRACKS

General Requirements

1. Scope: These specifications shall apply to overhead trolley contact wire crossings over railroad tracks.

2. Location: The pole, or towers, supporting the crossing shall preferably be outside the railroad company's right of way.

3. Unusually long crossings or adjoining spans shall be avoided wherever possible.

4. The poles, or towers, shall be located as far as practicable from inflammable materials or structures.

5. Trolley guards should not be used, except possibly in unusual cases, due to complicated alignment of the crossing track.

6. Clearance: The side clearance of poles supporting the trolley wires shall not be less than 12 ft. from the nearest rail of the main railroad track, nor less than 6 ft. from the nearest rail of railroad sidings, unless the former distance is greater than existing clearances from the rail or involves unusually long spans; but in no case shall the clearance be less than 6 ft. At loading sidings sufficient space shall be left for a driveway.

7. The clear headroom shall not be less than 21 ft. above the top of rail under the most unfavorable conditions of temperature and loading, and the height of trolley wire above top of rail shall be as nearly as possible uniform for at least 100 ft. on either side of the crossing span.

8. Catenary construction for crossing and adjoining spans shall be used when the difference in height of trolley wire above top of rail between the middle of such spans and the points of support of same, with ordinary construction, would exceed 12 in. in a 100-ft. span, or a proportionate difference for spans of other lengths.

9. Conductors: The normal mechanical tension in trolley wires shall generally be the same in the crossing span and in the adjoining span on each side. This shall also apply to the suspension cable in catenary construction.

10. Neither the trolley wire nor its supporting wires shall be spliced in the crossing span nor between the points of anchorage on either side.

11. Temperature: In the computation of stress and clearances, and in erection, provision shall be made for a variation in temperature from —20 deg. to +120 deg. Fahr. A suitable modification in temperature requirements shall be made for regions in which the above limits would not fairly represent the extreme range of temperature.

12. For span construction the poles adjacent to the crossing shall be guyed away from the trolley wire when practicable.

13. The trolley wire shall be anchored in both directions at the third pole on each side of the crossing, except where impracticable on account of adjoining curves, and all anchored poles shall be guyed back.

14. At each end of the crossing span the suspension from the pole, or bracket, shall be in duplicate, each suspension to be of sufficient strength to sustain the maximum loading.

15. Inspection: If required by contract between the crossing companies, all material and workmanship shall be subject to the inspection of the company crossed, provided that reasonable notice of the intention to make inspection shall be given such company. Defective material shall be rejected, or shall be removed and replaced with suitable material.

16. Drawings: If required by contract between the crossing companies, —— complete sets of general and detail drawings shall be furnished for approval before any construction is commenced.

Loads

17. The conductors shall be considered as uniformly loaded throughout their length, with a load equal to the resultant of the dead load, plus the weight of a layer of ice ½ in. in thickness, and a wind pressure of 8 lb. per square foot on the ice-covered diameter, at a temperature of 0 deg. Fahr.

18. The weight of ice shall be assumed at 57 lb. per cu. ft. (0.033 lb. per cu. in.).

19. Insulators and attachments shall be designed to withstand, with the designed factor of safety, the weight and tension of the trolley contact and supporting wires, or cables, under the maximum loading.

20. The poles, or towers, and the setting thereof, shall be designed to withstand, with the designated factor of safety, the combined stresses from their own weight, the wind pressure on the pole or tower, and the above wire loading on the crossing spans and the next adjoining span on either side. The wind pressure on the poles or towers shall be assumed at 13 lb. per sq. ft. on the projected area of solid or closed structures, and on one and one-half times the projected area of latticed structures.

21. The poles shall be designed to withstand loads specified in paragraph 20, joined with the unbalanced tension of broken trolley wires.

22. The poles may be permitted reasonable deflection under the specified loading, provided that such deflection does not reduce the head room below the requirements of paragraph 7, or produce stresses in excess of those specified in paragraphs 53-56, inclusive.

23. The minimum depth of pole setting shall be 6 ft.

Factors of Safety

24. The ultimate unit stress divided by the allowable unit stress shall not be less than the following:

Trolley wire	2
Other wires and cables (except guys)	2
Insulators, conductor attachments, guys	3
Wooden poles and crossarms	6
Structural steel	3
Reinforced concrete poles and crossarms	4
Foundations	2

NOTE.—The use of treated poles and crossarms is recommended. The treatment of wooden poles and crossarms covers thorough impregnation with preservative by either closed or open tank process. The treatment of poles need not extend higher than a point 2 ft. above the ground line.

25. Insulators: Insulators shall not flash over at four times the normal working voltage, under a precipitation of water 1/5 in. per minute at an inclination of 45 deg. to the axis of the insulator.

Material

26. The trolley contact wire shall be of hard-drawn copper, or other material not easily abraded.

27. The minimum size of trolley contact wire shall be No. 00 B. & S. gage.

28. Strain insulators shall be so constructed that the wires holding the insulators in position will interlock in case of failure of the insulator.

29. Span wires shall be galvanized, or copper-covered stranded steel, or bronze cables, not less than 5-16 in. in diameter.

30. Guys: Guys shall be galvanized or copper-covered stranded steel, or bronze cable, not less than 1-4 in. in diameter, or galvanized rolled rods of equivalent tensile strength.

31. Guys to the ground shall connect to a galvanized anchor rod, extending at least 1 ft. above the ground level.

32. The detail of the anchorage shall be definitely shown upon the plans.

33. Poles: Wooden poles shall be of selected timber, peeled, free from defects which would decrease their strength or durability, not less than 7 in. minimum diameter at the top, or 12 in. at 6 ft. from the butt.

34. Tubular poles shall be of wrought iron or steel pipe, the minimum size of which shall be, for two-section poles, standard-weight 5-in. and 6-in. pipe, and for three-section poles, 4-in., 5-in. and 6-in. pipe.

NOTE.—The use of protective sleeves at the ground line is recommended.

35. Concrete: All concrete and concrete material shall be in accordance with the requirements of the specifications for concrete and reinforced concrete.

Structural Steel

36. Structural steel shall be in accordance with the manufacturer's standard specifications.

37. The design and workmanship shall be strictly in accordance with first-class practice.

38. The form of the frame shall be such that the stresses may be computed with reasonable accuracy, or the strength shall be determined by actual test.

39. The sections used shall permit inspection, cleaning and painting, and shall be free from pockets in which water or dirt can collect.

40. The length of a main compression member shall not exceed 180 times its least radius of gyration.

41. The minimum thickness of metal in galvanized structures shall be ¼ in. for main members and ⅛ in. for secondary members. The minimum thickness of painted material shall be ¼ in.

Protective Coatings

42. All structural steel shall be thoroughly cleaned at the shop and be galvanized, or given one coat of approved paint.

43. Painting: All contact surfaces shall be given one coat of paint before assembling.

44. All painted structural steel shall be given two field coats of an approved paint.

45. The surface of the metal shall be thoroughly cleaned of all dirt, grease, scale, etc., before painting, and no painting shall be done in freezing or rainy weather.

46. Galvanizing: Galvanized material shall be in accordance with the standard specifications for galvanizing on iron and steel.

47. Bolt holes in galvanized material shall be made before galvanizing.

Foundations

48. The foundations for steel poles and towers shall be designed to prevent overturning. The weight of concrete shall be assumed as 140 lb. per cu. ft. In good ground the weight of "earth" (calculated 30 deg. from the vertical) shall be assumed as 100 lb. per cu. ft. In swampy ground special measures shall be taken to prevent uplift or depression.

49. The top of the concrete foundations, or casing, shall not be less than 6 in. above the surface of the ground, nor less than 1 ft. above extreme high water.

50 When located in swampy ground, wooden crossing and next adjoining poles shall be set in barrels of broken stone or gravel, or in broken stone or timber footings.

51. When located in the sides of banks, or when subject to washouts, foundations shall be given additional depth, or be protected by cribbing or riprap.

52. All foundations and pole settings shall be tamped in 6-in. layers while back filling.

Working Unit Stresses

Obtained by dividing the ultimate breaking strength by the factors of safety given in paragraph 24.

53. Structural Steel:

Shear	14,000	lb. per sq. in.
Tension (net section)	18,000	lb. per sq. in.
Compression	18,000—60½	lb. per sq. in.

54. Rivets, Pins:

Shear	10,000 lb. per sq. in.
Bearing	20,000 lb. per sq. in.
Bending	20,000 lb. per sq. in.

55. Bolts:

Shear	8,500 lb. per sq. in.
Bearing	17,000 lb. per sq. in.
Bending	17,000 lb. per sq. in.

56. Wire:

Copper, hard-drawn, solid, B. & S. gage, Nos. 0000, 000, 00—25,000 lb. per sq. in.

57. Timber:

	Bending	Compression $\frac{L}{60D}$
	Lb. per Sq. In.	
Eastern white cedar	600	600
Chestnut	850	850
Washington cedar	850	850
Idaho cedar	850	850
Port Orford cedar	1150	1150
Long leaf yellow pine	1100	1100
Short leaf yellow pine	950	950
Douglas fir	1000	1000
White oak	950	950
Red cedar	700	700
Bald cypress (heartwood)	800	800
Redwood	850	850
Catalpa	500	500
Juniper	550	550

L = Length in inches.
D = Least side, or diameter, in inches.

APPENDIX B

SPECIFICATIONS FOR OVERHEAD CROSSINGS OF FOREIGN WIRES WITH ELECTRIC RAILWAY WIRES

General Requirements

1. Scope: These specifications shall apply to crossings of electric light, power, telephone, telegraph and other similar lines over electric railway right of way and tracks or lines of wires thereon.

2. Locations: The poles, or towers, supporting the crossing shall preferably be outside the electric railway company's right of way.

3. Unusually long crossing spans shall be avoided wherever practicable.

4. The poles, or towers, shall be located as far as practicable from inflammable materials or structures.

5. The poles, or towers, supporting the crossing span and the adjoining span on each side, preferably, shall be in a straight line.

6. The crossing wires, or cables, shall cross over low-tension feed wires, telegraph, telephone, signal and similar wires, but under high-tension power transmission wires wherever practicable; except that when the voltage of crossing wires is higher than that of the electric railway company's high-tension wires such crossing wires should cross over all wires of the electric railway company.

7. Cradles, or overhead bridges, shall not be used.

8. Clearance: The side clearance of poles supporting the crossing wires shall be not less than 12 ft. from the nearest rail of the main track, nor less than 6 ft. from the nearest rail of sidings, unless the former distance is greater than existing clearances from the rail or involves unusually long spans; but in no case shall the clearance be less than 6 ft. At loading sidings sufficient space shall be left for a driveway.

9. The clear headroom of crossing wires shall not be less than 30 ft. above the top of the rail under the most unfavorable conditions of temperature and loading, except that a single pair of service wires at a potential not exceeding 750 volts may be carried at minimum headroom of 24 ft.

10. Clearance between crossing circuits either of which exceeds 750 volts under the most unfavorable conditions of temperature and loading shall not be less than 8 ft. where possible. For circuits not exceeding 750 volts the clearance between crossing wires may be 2 ft. with insulated wires and 4 ft. with bare wires.

11. The separation of conductors carrying alternating current, supported by pin insulators for spans not exceeding 150 ft., shall not be less than:

Line Voltage	Separation, In.
Not exceeding 6600	14½
Exceeding 6600 but not exceeding 14000	24
Exceeding 14000 but not exceeding 27000	30
Exceeding 27000 but not exceeding 35000	30
Exceeding 35000 but not exceeding 47000	45
Exceeding 47000 but not exceeding 70000	60

Note.—For spans exceeding 150 ft. the pin spacing should be increased, depending upon the length of the span and the sag of the conductors.

With constant potential direct-current circuits, not exceeding 750 volts, the minimum spacing shall be 10 in.

Note.—This requirement does not apply to wires of the same phase or polarity between which there is no difference of potential..

12. When supported by insulators of the disk or suspension type, the crossing span and the next adjoining spans shall be dead-ended at the poles or towers supporting the crossing spans, so that at these poles or towers these insulators shall be used as strain insulators.

The clearance in any direction between the conductors nearest the pole or tower and the pole or tower shall not be less than:

Line Voltage	Clearances
Not exceeding 14000	9
Exceeding 14000 but not exceeding 27000	15
Exceeding 27000 but not exceeding 35000	18
Exceeding 35000 but not exceeding 47000	21
Exceeding 47000 but not exceeding 70000	24

13. Conductors: The normal mechanical tension in the conductors shall generally be the same in the crossing span and in the adjoining span on each side, and the difference in length of the crossing and adjoining spans shall generally be not more than 50 per cent of the length of the crossing span.

14. The conductors shall not be spliced in the crossing span or in the adjoining span on either side.

15. The method of attaching the conductors to the poles or towers shall be such as to hold the wires under a maximum loading to the supporting structure, in case of shattered insulators or wires broken or burned at the insulator, without allowing an amount of slip which would materially reduce the clearance specified in paragraphs 10 and 11.

16. Guys: Wooden poles supporting the crossing span shall be side guyed in both directions, if practicable, and be head guyed in both directions. Braces may be used instead of guys.

Strain insulators shall be used in guys from wooden poles carrying any power wire of less than 6,600 volts. Strain insulators shall not be used in guying steel structure, nor required on wooden poles carrying wires all of which are 6,600 volts or more.

17. Signs: If required by the electric railway company, warning signs of an approved design shall be placed on all poles and towers located on the electric railway company's right of way.

18. Grounding: For voltages over 5,000 volts, wooden crossarms, if used, shall be provided with a grounded metallic plate on top of the arm, which shall be not less than ⅛ in. in thickness and have a sectional area and conductivity not less than that of the line conductor. Metal pins shall be electrically connected to this ground. Metal poles and metal arms on wooden poles shall be grounded.

19. The electrical conductivity of the ground conductor shall be adjusted to the short-circuit capacity of the system and shall not be less than that of a No. 4 B. & S. gage copper wire.

20. Temperature: In the computation of stresses and clearances, and in erection, provision shall be made for a variation in temperature from —20 deg. to +120 deg. Fahr. A suitable modification in the temperature requirements shall be made for regions in which the above limits would not fairly represent the extreme range of temperature.

21 and 22. Inspection: (Same as like named paragraphs of Appendix A).

23 to 26. (Same as paragraphs 17 to 20 of Appendix A).

27. The poles, or towers, shall also be designed to withstand the loads specified in paragraph 26, combined with the unbalanced tension of:

Two broken wires for poles, or towers, carrying five wires or less.
Three broken wires for poles, or towers, carrying six to ten wires.
Four broken wires for poles, or towers, carrying eleven or more wires.

Crossarms shall be designed to withstand the loading spec-

ified in paragraph 26, combined with the unbalanced tension of one wire broken at the pin farthest from the pole.

28. The poles, or towers, may be permitted a reasonable deflection under the specified loading, provided that such deflection does not reduce the clearances specified in paragraph 10 more than 25 per cent, or produce stresses in excess of those specified in paragraphs 66 to 69, inclusive.

29. The minimum depth of pole setting shall be 6 ft.

Factors of Safety

30. (Same as paragraph 24 of Appendix A).

31. Insulators: Insulators for line voltage of less than 9000 shall not flash over at four times the normal working voltage, under a precipitation of water of 1-5 in. per minute at an inclination of 45 deg. to the axis of the insulator.

32. Each separate part of the built-up insulator for line voltages over 9,000 volts shall be subjected to the dry flash-over test of that part for five consecutive minutes.

33. Each assembled and cemented insulator shall be subjected to its dry flash-over test for five consecutive minutes.

34. The dry flash-over test shall not be less than:

Line Voltage	Test Voltage
Exceeding 9000 but not exceeding 14000	65000
Exceeding 14000 but not exceeding 27000	100000
Exceeding 27000 but not exceeding 35000	125000
Exceeding 35000 but not exceeding 47000	150000
Exceeding 60000 but not exceeding	three times line voltage

35. Each assembled insulator shall be subjected to a wet flash-over test under a precipitation of water of 1-5 in. per minute, at an inclination of 45 deg. to the axis of the insulator.

The wet flash-over test shall not be less than:

Line Voltage	Test Voltage
Exceeding 9000 but not exceeding 14000	40000
Exceeding 14000 but not exceeding 27000	60000
Exceeding 27000 but not exceeding 35000	80000
Exceeding 35000 but not exceeding 47000	100000
Exceeding 47000 but not exceeding 60000	120000
Exceeding 60000 but not exceeding	twice lines voltage

36. Test voltages above 35,000 volts shall be determined by the A. I. E. E. standard spark gap method.

37. Test voltages below 35,000 volts shall be determined by transformer ratio.

Material

38. The conductors shall be of copper, aluminum or other non-corrodible material, except that in exceptionally long spans where the required mechanical strength cannot be obtained with the above materials, galvanized or copper-covered steel strand may be used.

39. For voltage not exceeding 750 volts, solid or stranded conductors may be used up to and including No. 0000 in size; above No. 0000 in size stranded conductors shall be used. For voltages exceeding 750 volts, and not exceeding 5000 volts, solid or stranded conductors may be used up to and including No. 00 in size; above No. 00 in size conductors shall be stranded. Aluminum conductors for all voltages and sizes shall be stranded.

The minimum size of conductors shall be as follows:

No. 6 B. & S. gage copper, for voltages not exceeding 5000.
No. 4 B. & S. gage copper, for voltages not exceeding 5000.
No. 1 B. & S. gage aluminum for all voltages.

40. Insulators: Insulators shall be of porcelain for voltages exceeding 5,000 volts.

41. Strain insulators for guys shall have an ultimate strength of not less than twice that of the guy in which they are placed. Strain insulators shall be so constructed that the guy wires holding the insulators in position will interlock in case of the failure of the insulator.

Strain insulators shall not flash over at four times the maximum line voltage under a precipitation of water of 1-5 in. per minute, at an inclination of 45 deg. at the axis of the insulator.

42. Pins: For voltages of 5000 or over, insulator pins shall be of steel, wrought iron, malleable iron, or other approved metal or alloy, and shall be galvanized, or otherwise protected from corrosion.

43. Guys: Guys shall be galvanized or copper-covered stranded steel, or bronze cable, not less than 5-16 in. in diameter, or galvanized rolled rods of equivalent tensile strength.

44. Guys to the ground shall connect to a galvanized anchor rod extending at least 1 ft. above the ground level.

45. The detail of the anchorage shall be definitely shown upon the plans.

46 and 47. Poles: (Same as paragraphs 33 and 34 of Appendix A).

48. Concrete: (Same as paragraph 35 of Appendix A).

Structural Steel

49 to 52. (Same as paragraphs 36 to 39 of Appendix A).

53. The length of a main compression member shall not exceed 180 times its least radius of gyration. The length of a secondary compression member shall not exceed 220 times its least radius of gyration.

54. (Same as paragraph 41 of Appendix A).

61 to 65. (Same as the like-named chapters of Appendix A).

Working Unit Stresses

66 to 68. (Same as like-named chapters of Appendix A).

69. Wire and Cables:

Copper, hard-drawn, solid, B. & S. gage, Nos. 0000, 000, 00	25,000
Copper, hard-drawn, solid, B. & S. gage, No. 0	27,500
Copper, hard-drawn, solid, B. & S. gage, No. 1	28,500
Copper hard-drawn solid, B. & S. gage No. 2, 4, 6	30,000
Copper, soft-drawn, solid, B. & S. gage	17,000
Copper, hard-drawn, stranded, B. & S. gage	30,000
Copper, soft-drawn, stranded, B. & S. gage	17,000
Aluminum, hard-drawn, stranded, gage under 000, 4, 4, 4, 4	12,000
Aluminum, hard-drawn, stranded, B. & S. gage, 0000 and over	11,500

70. Untreated Timber: (Same as paragraph 57 of Appendix A).

References 1911 Proceedings

Committee Report Appendix A—Wind and Ice Loads, pages 121-123. Appendix B—Tables and Curves of Conductor Sags, pages 124-130.

(Appendices C, D and all subdivisions of E, except that relating to trolley cars, are omitted).

SPECIFICATION FOR EARS FOR TROLLEY WIRE

1. Definition of Terms: (Same as Appendix A).

2. General Description: The material required under these specifications is for trolley ears made from smooth one-piece castings, free from blow-holes and sand-holes. The completed trolley ears and the alloy of which they are made shall conform to the following requirements.

3. Construction: (a) The ears must be of clinch type shown in the drawings of the company and must correspond to the drawing with respect to form and construction.

(b) The lips and groove must be finished in such a manner that the ear shall fit the wire snugly and that there shall be no rough places which will interfere with the proper attaching of the ear to the wire.

(c) All ears must be tapped for a standard 5/8-in. stud, and must fit such a stud snugly. The boss must contain eight full threads and the hole must be countersunk slightly to allow the ears to be easily applied to the stud without danger of cross threading. The boss must contain sufficient metal, so that the walls shall be in no place less than 5-32 in. thick, and the average thickness shall not be less than 3-16 in.

4. Composition: Trolley ears of the following composition are desired:

	Per Cent
Copper	84
Zinc	10
Lead	3
Tin	3

All trolley ears must have a composition within these limits:

	Per Cent
Copper—not less than	84
Tin—not less than	2.5 or over 5
Lead—not over	4

There must not be over 0.2 per cent of any other metal other than copper, zinc, tin and lead.

5. Mechanical Requirements: The metal must be sufficiently ductile not to show cracks when the lips are peened down to the wire.

6. Inspection: When a shipment of trolley ears is received, it will be inspected and samples taken at random, which must pass the above requirements.

7. Failure to Comply with Requirements: (Appendix B).

REPORT OF THE COMMITTEE ON INTERURBAN RULES*

BY C. F. HANDSHY, CHAIRMAN; J. J. DOYLE, W. H. COLLINS, G. H. CLIFFORD, F. A. BOUTELLE AND A. SHANE

The executive committee requested President Thomas N. McCarter of the American Association to forward a letter to member companies requesting suggestions as to inadequacies in the present codes of city and interurban rules, with a view to making such codes more nearly fit the requirements of a majority of the companies.

It is very satisfactory to report that in the main the replies received from our members to the letter of Mr. McCarter indicated a general adoption of the codes, either as a whole or in part. In the latter case, the changes, amendments or eliminations have been to suit some particular local condition. From this correspondence it would seem, as a whole, that the codes fit the demands of our members quite closely and, as a matter of general interest, we are attaching to the report, as an appendix, some expressions from the members.

Your committee has held two meetings, one being called during the period of the mid-year conference. A sub-committee was appointed to study the city and interurban codes with a view to bringing about proper uniformity. [The report of the sob-committee is published in the report of the committee on city rules.—Eds.]

Your committee at a meeting in Chicago on July 20, 1912, disposed of these suggestions as follows:

Recommended, that city rule No. 23, "bell signals," be changed to conform to recommendations of the sub-committee and thus become uniform with interurban rule No. 98: The committee did not approve the change in the third paragraph of city rule No. 23, which eliminates the following: "The motorman will answer the signal to stop from conductor by one loud tap of gong," but recommended that this paragraph be changed to require that motorman give two taps of the gong as the answer signal to the conductor, whether the conductor's signal to the motorman is to stop or go ahead. Rule as revised reads as follows (the amended section bracketed in italics):

"Bell Signals.

"23. From conductor to motorman to be given on motorman's signal bell:

"One bell—'Stop at next crossing or station.'

"Two bells—'Go ahead.'

"Three bells—'Stop immediately.'

"Four bells (given when car is standing)—'Back car slowly.'

"From motorman to conductor, to be given on conductor's signal bell:

"One bell—'Come forward.'

"Two bells—'Watch the trolley' and danger signal to the conductor. [*Two bells—'Pull trolley down to roof.'*]

Three bells—'Set rear brake.'

"Four bells—Signal to conductor that motorman desires to back the car.

"[*Five bells—'Watch trolley.'*]

"Whenever a car in service is stopped, for any cause except to take on or let off passengers, the motorman will, as soon as he is ready to go forward, give two taps of the gong; after which, if the conductor is ready to proceed, he will give the 'go ahead' signal.

"The motorman will answer the signal to stop from conductor by one [*two*] loud taps of the gong and two loud taps of the gong after receiving the signal to go ahead. If unable to proceed immediately upon receipt of signal, motorman will wait for another 'go ahead' signal before starting the car.

"When car is standing and motorman desires to back for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify 'all is clear behind.' However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends on a double-end car.

"When two or more cars are coupled together, 'go ahead' signal must first be given by conductor of rear car and be repeated by each conductor in succession on his signal bell, when he is ready to start."

The committee further approved the recommendation of the sub-committee that city rule No. 32, "steam railroad crossings," be substituted for interurban rule No. 183, with the exception that in rule No. 183, for interurban operation only, the requirement that motorman look back before starting car be eliminated as impracticable. City rule No. 32 follows:

"Steam Railroad Crossings.

"32. When approaching steam railroad or other flag crossings, the motorman will bring his car to a full stop at a distance of ..... feet, and will not proceed until the conductor has gone ahead to the center of the crossing, looked both ways, and given the come ahead signal. Before starting, the motorman will look back to see that no passengers are getting on or off; and in no case proceed, even after the conductor's signal, until he has also examined the crossing and satisfied himself that steam cars are not approaching.

"When there is more than one track the conductor must remain in advance of the car until the last track is reached.

"After boarding car, conductor will give go ahead signal to notify motorman that he is aboard. Motorman is forbidden to proceed without this signal.

"Where crossing is protected by derail, interlocking plant, or flagman (employed by the company) this rule does not apply, special instructions being issued to govern in such cases."

Your attention is directed to the recommendation of the sub-committee, that city rule No. 197 and interurban rule No. 377 be discussed on the floor of the convention. This committee approves the suggestion and respectfully urges the convention that this subject of defective transfers receive discussion here.

The committee also had in hand suggestions from various sources as to modifications in the interurban code and, due attention being given to these, the following amendments to the code are respectfully suggested:

That rule No. 92 (c) now reading: "swung vertically in a circle across the track when the train is standing," be revised to read: "swung vertically in a circle at half-arm's length across the track when the train is standing." [Diagram shown on code page 100.]

That in rule No. 92 (e) the words "in a circle" be eliminated and rule made to read: "Swung horizontally above the head when the train is standing." [Diagram shown on code page 102.]

Rule as revised reads as follows (recommended changes bracketed, additions in italics):

"Hand, Flag and Lamp Signals.

Manner of Using	Indication
(a) Swung across the track.....	Stop.
(b) Raised and lowered vertically.....	Proceed.
(c) Swung vertically in a circle across the track when the train is standing.....	Back.
[(c) Swung vertically in a circle *at half arm's length* across the track when the train is standing.].....	[Back.]
(d) Swung vertically in a circle at arm's length across the track when the train is running	Train has parted.
(e) Swung horizontally in a circle when the train is standing.....	Apply air brakes.
[(e) Swung horizontally above the head when the train is standing].....	[Apply air brakes.]
(f) Held at arm's length above the head when train is standing.....	Release air brakes."

That rule No. 149 be changed to provide that one torpedo be placed on rail on engineer's side; that is, right-hand rail

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Chicago, Ill., Oct. 7, 8, 9, 10 and 11, 1912.

facing the crossing to be protected. The present rule requires two torpedoes, one on each rail immediately opposite each other.

Rule as revised reads as follows (recommended changes shown bracketed in italics):

"Accident on Railroad Crossing.

"149. In case of a breakdown or an accident which disables a train on a railroad crossing, not protected by interlocker, the conductor and the motorman must both attend to protecting their train, by one going in each direction at least three-quarters of a mile on the steam road tracks and placing two torpedoes, one on each rail immediately opposite each other [*and placing one torpedo on rail on engineer's side; that is, the right-hand rail facing the crossing that is to be protected*]. Any responsible employee or other person may take the place of the motorman in flagging, in order that he may attend to getting his car off the crossing. When car is clear of crossing the flagmen may be recalled by whistle signal as provided in rule No. 95, but the flagmen must remain at their posts and signal any approaching train to stop until recalled by whistle signal, using a red flag by day and red fusee by night, in addition to their lanterns. It is the duty of the conductor to first notify his passengers to leave the car."

That in rule No. 159, second paragraph, the words "and motorman" be inserted after "conductor" in second line, and thus require both conductor and motorman to sign train register instead of conductor only, as follows (recommended change shown bracketed in italics):

"Trains Leaving Initial Stations.

"159. A train must not leave its initial station on any division, or a junction, or pass from double to single track, without order or clearance, and until it is ascertained from the dispatcher whether all trains due have arrived and departed.

"Where a train register is maintained, it shall be the duty of the conductor [*and motorman*] to register and to note carefully whether all trains due have arrived and departed."

That in rule No. 172, the words "proper stop" be substituted for "red" in fifth line preceding "signals," as follows (recommended change shown bracketed in italics):

"Protect Train When Stopped.

"172. When a train stops or is delayed under circumstances under which it may be overtaken by another train, the conductor or flagman must go back immediately with red [*proper stop*] signals a sufficient distance to insure full protection not less than 1,000 ft. When recalled he may return to his train, first placing two torpedoes on the rail when the conditions require it. The front of a train must be protected in the same way, when necessary, by the motorman. The duty herein required of the conductor or motorman may be performed by the other when desirable for any reason."

That in rule No. 218, second sentence, paragraph one, be changed to read as follows: "The motorman and conductor must not pass a station where such signals are displayed without receiving a train order," as follows (second sentence of first paragraph, as now recommended shown bracketed in italics):

"Issuing Orders at Stations.

"218. To issue train orders at stations where there are operators or agents, the dispatcher will instruct the operator or agent to display a stop signal for the motorman and conductor to stop for orders. The motorman and conductor must not pass a station where such signals are displayed without reporting to the agent or train dispatcher, and until such signals have been taken down, removed or cleared. [*The motorman and conductor must not pass a station where such signals are displayed without receiving a train order.*]

"When a train order is given through an agent he must read it back to the dispatcher, and complete it in the same manner as a motorman. The conductor and motorman receiving such an order must each read it aloud back to the agent, and receipt for the same by writing their names upon it before detaching the copies intended for them."

That in rule No. 229 changes be made that will insure greater care in the exchange of train orders between crews and that will provide for a permanent record, to be signed by the crews thus exchanging, as follows:

"Exchange and Explain Orders When Changing Off (Present Rule).

"229. In case motormen or conductors change off before the completion of their trip, they must carefully exchange all orders they may have, and each must know that his orders are perfectly understood by the other. Changes of this kind, however, must never be made without permission from the superintendent, unless regularly provided for in the assignment of runs."

"Exchange and Explain Orders When Changing Off (Recommended Rule).

"229. In case motormen or conductors change off before the completion of their trip, they must carefully exchange all orders they may have and each must know that his orders are perfectly understood by the other. Receipts must be taken by each for all orders thus exchanged on blanks provided for that purpose. Changes of this kind, however, must never be made without permission from the superintendent, unless regularly provided for in the assignment of runs."

LEGISLATIVE AND COMMISSION RULINGS REGARDING RULES

Your committee has endeavored to obtain from member companies in each state data regarding action taken by the various Public Service Commissions having jurisdiction with regard to our standard codes of rules, or other action that would indicate necessity or desirability of changing the codes. It has not received any reports of action taken approving or disapproving a specific code, but it finds that the Railroad Commission of Indiana, on May 28, 1912, instructed all interurban companies to print a code of rules for the guidance of employees, the codes to be given to all persons engaged in the operation of trains and cars and copies filed with the commission. The commission directed that periodical examinations be made regarding rules.

CONFERENCE WITH AMERICAN RAILWAY ASSOCIATION

During the present year, with the co-operation of George H. Harries, first vice-president of the American Electric Railway Association, and Daniel Willard, president of the American Railway Association, arrangements for conference with the American Railway Association have been made. It is proposed to discuss the standard code of the American Railway Association and the standard code of this association, with a view to considering changes in rules applicable to both steam and interurban operation.

RULES FOR THE OPERATION OF BLOCK SIGNALS

It has not been deemed practicable by your committee to attempt to evolve at this time a standard set of rules to govern the operation of block signals. In the opinion of the committee this question, as it relates to electric railways, has not been developed to the extent where it seems possible to display a standard code. The committee, however, recommends that the subject be continued and that this committee be instructed to canvass the situation thoroughly with the joint committee on block signals for electric railways, which represents the Engineering and Transportation & Traffic Associations.

The appendix to the report gives extracts from a number of the replies to the letter sent to member companies by President McCarter of the American Association in regard to the codes of rules.

The Montreal (Que.) Tramways is building in its shops two special cars to transport prisoners from the new provincial jail at Bordeaux to the courthouse. The cars will be wholly constructed of steel plates, and will be completely closed in, there being no windows.

REPORT OF THE COMMITTEE ON CITY RULES*

BY E. F. PECK, CHAIRMAN; J. M'MILLAN, GEORGE KUEMMERLEIN, JR., W. A. HEINDLE, W. H. GLENN AND W. B. ROCKWELL

One of the gratifying results of the year was the tenor of the replies received to a letter sent out by President McCarter to member companies, requesting information as to deficiencies in the codes and the extent of their application to actual service. This letter and some of the replies are given in the report of the committee on interurban rules.

During the period of the January conference, your committee held a meeting to which representatives of the committee on interurban rules were invited to discuss rules in the two codes, which, while similar in meaning, were not uniform in wording. The result of this meeting was the appointment of a sub-committee consisting of W. B. Rockwell and J. J. Doyle to consider this matter. The sub-committee recommended as follows:

"(1) That city rule No. 23, bell signals, signals from motorman to conductor, be amended to read as follows: Two bells—'Pull trolley down to roof;' five bells—'Watch trolley.' The other bell signals remaining as heretofore.

"(2) That the third paragraph of city rule No. 23 be changed to read as follows: 'The motorman will answer the signal to go ahead by two loud taps of the gong. If unable to proceed immediately upon receipt of signal, motorman will wait for another "Go ahead" signal before starting the car.' The balance of the rule to remain unchanged.

"(3) That interurban rule No. 183 be eliminated and city rule No. 32 adopted in its stead.

"We wish to call attention to the conflict which exists between city rule No. 197 and interurban rule No. 377. This touches on such a broad question of policy that we hesitate to make any suggestion in the matter, but wish to draw the attention of both committees to the question in order that they may take such action as seems proper in the premises."

The recommendations of the sub-committee were considered by both the committee on interurban rules and this committee, with the following results:

"(1) That the amendments with regard to city rule No. 23 be approved, with the exception that instead of eliminating that portion of the third paragraph reading, 'The motorman will answer the signal to stop from conductor by one loud tap of gong,' the paragraph be changed to require that the motorman give two taps of the gong as the answer signal to the conductor, whether the conductor's signal to the motorman is to stop or to go ahead."

This rule in its present form and as it is proposed to be revised is set forth in the report of the committee on interurban rules to be presented here.

"(2) That the recommendation that city rule No. 32, steam railroad crossings, be substituted for interurban rule No. 183, be approved with the exception that in rule No. 183, interurban operation only, the requirement that motorman look back before starting be eliminated."

Both rules are shown in the report of the committee on interurban rules to be presented here.

"(3) The committee on city rules approves heartily the recommendation of the sub-committee that city rule No. 197 and interurban rule No. 377 receive thorough discussion on the floor of this convention."

The committee agrees that the question involved is one of policy and feels that the convention, as a whole, should express itself for the guidance of the two committees if future amendments or reconciliation of the two rules are to be made. Both rules are shown in the report of the committee on interurban rules to be presented here.

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Chicago, Ill., Oct. 7, 8, 9, 10 and 11, 1912.

LEGISLATIVE OR COMMISSION RULINGS

Inquiry concerning action taken by regulating bodies with regard to rules for city operation has not developed anything that would indicate that the rules for city operation have received anything but cursory attention at the hands of such bodies. The committee is therefore unable to present anything of particular value on this subject at this time. It recommends, however, that another study be made during the next year and also that a similar letter to that sent out by Mr. McCarter in 1912 be sent to members in future years, feeling that in this way the use of the standard codes will be increased from year to year.

RULES FOR PREPAYMENT CAR OPERATION

Your committee requested from companies utilizing prepayment operation data with regard to rules which applied especially to that class of operation, with a view to comparing such rules with those adopted by this association as standard practice. Subsequently a compilation was made, to determine what essential differences exist in rules covering the various points and what additional regulations, if any, were in general use beyond those covered in that section of our standard code beginning with rule No. 350 and ending with rule No. 377. Taking up these rules in order we find the following variations:

Our rule No. 350, position, reads:

"The conductor's position under all ordinary circumstances is at the rear, in the place provided for him. While the car is at a standstill, taking on and discharging passengers, he must watch both the entrance and exit and see that passengers board and leave the car by the proper openings. The conductor should not leave his position at rear at places where several passengers are likely to board or leave the car."

Some of the variations from this rule provide as follows:

That conductor, when passengers are boarding car, "must stand facing directly to rear of car."

Conductor must stand "so that he obtains a full view of the fare box." This last specification is found in the rule books of a number of companies, as is also the provision that "the conductor must see that passengers are safely on or off car before giving the signal to proceed."

Another company specifies that "in descending steep grades conductor should be in a position to apply promptly the rear hand brake in case of necessity."

No replies have been received from companies using center entrance prepayment cars. It is obvious, however, that changes in the present rule No. 350 would be required to make it apply to center entrance operation.

Our rule No. 351, fare collection, reads:

"The conductor must register every fare promptly when collected. He shall not allow unauthorized passengers to pass into the car without paying fare. When passengers enter interior of car without paying fare, the conductor must enter car and collect fare as soon thereafter as his duties at the rear permit, returning at once to his position at the rear. Conductors shall request passengers to 'have your fare ready, please.'"

One company stipulates that "fares must never be allowed to remain on top of fare box, but must be dropped promptly into box beneath. If fares are allowed to accumulate, conductor will be unable to tell what kind of fare passenger has paid. Conductors must not handle fares, but must insist that passenger drop own fare in box."

Other companies provide in this rule for procedure in case of deposit in fare boxes of excess fares; also place upon the conductor the responsibility for counterfeit or mutilated coins.

Some companies incorporated in their rules covering fare collection the provisions of our rule No. 357, covering the collection of fares from passengers who ride to the end of the line and return on the same car. Our rule No. 357 provides that conductor shall be careful to collect the fares from such passengers, but does not state in what manner this shall be done. Some companies require the passengers to go to the rear platform to deposit fares in fare box.

Other companies provide for the registration of fares collected before change is made or transfers issued. They also provide in the same rule for the collection of transfers. Provision is also made for the registration of fares in the presence of the person paying fare for more than one.

Our rule No. 352, making change, reads:

"When a passenger presents a bill or coin which would cause delay in making change, and others are waiting to enter car, the conductor shall politely request passenger to step aside on the platform until he has opportunity to make change."

Some companies provide for the amount of change that conductors must carry, and also describe the procedure to be followed when passengers present money for change, that is, that a conductor shall return to the passenger the full amount, the passenger then to deposit in fare box the proper fare.

Our rule No. 353, no one to remain on rear platform, reads:

"The conductor shall request passengers to enter the car and to move forward, endeavoring to keep exit and entrance portions of the platform clear at all times."

Many companies are much more explicit in the procedure to be followed to relieve the platform of passengers and also provide for the closing of doors or gates to prevent other passengers boarding the car, while other companies state that, under no circumstances, must ejectments be made for failure to obey the request of the conductor to enter car from platform.

Our rule No. 354, transfers, reads:

"Conductors will be governed by the existing regulations regarding the acceptance and issuance of transfers. If the validity of a transfer is in doubt, request the passenger to step aside until the matter can be decided in the usual way."

Inspection of the rules of other companies on this subject indicate quite general similarity to our rule, except that many provide in this rule that transfers will be issued only at the time fare is paid and also cover the rules for depositing transfers where fare boxes are used.

Our rule No. 355, preventing accidents, reads:

"The conductor shall see that all incoming passengers are safely on the platform before giving 'Go ahead' bells, and that those leaving the car at rear end do not step off while the car is in motion."

This rule, in many cases, is covered in the rule "position of conductors," and provision is also made for closing doors or gates where used. Also, provision is made in this rule to cover operation of doors by motormen, and some companies call particular attention to the fact that before giving starting signals, conductors must be careful to see that aged or infirm persons are in safe position within the car.

Our rule No. 356, leaving car, reads:

"When conductor is obliged to leave car for any purpose except flagging or other regular duties, the motorman shall close front end of car, take conductor's position and proceed as required by rule No. 29."

Rule No. 29, referred to, reads:

"When necessary for conductor to leave his car he must notify the motorman to protect passengers and car. Should passengers board car during absence of conductor, motorman will notify conductor of the number and location of such passengers upon his return.

"Cars in commission must not be left unprotected; either motorman or conductor always remaining in charge."

The following differences in the rules of member companies are noted:

"Where cars are provided with doors, conductors are required to close rear door and leave by front door when flagging railroad crossings."

Other companies provide that when conductors leave car, motormen will go to rear of car, permit passengers to enter and register fare properly in the presence of passengers.

Other companies prohibit passengers from boarding car in the absence of conductor.

Some companies specify that both men must not leave car at one time.

Our rule No. 357, passengers riding to end of line, reads:

"Conductors shall be careful to collect the fares from passengers riding to the end of the line and returning on same car."

The variations in the rules of member companies covering this matter have been referred to in the discussion under rule No. 351.

Our rule No. 358, package on platform, reads as follows:

"Bundles, packages, or anything else shall not be allowed to remain on rear platform."

Generally speaking, the rules of the member companies follow this rule quite closely.

Our rule No. 359, comfort of passengers, reads:

"The conductor's position at the rear must not interfere with the proper care of passengers as required by the general code."

This rule is omitted by a number of companies and those who have it in use follow quite generally the present rule No. 359.

Our rule No. 375, position of motorman, reads:

"The motorman's position is on the front platform, except when he is relieving the conductor, as provided in conductor's rule No. 356."

Some companies do not specify the position of motormen; other companies, while specifying it, also include in the rule restrictions against passengers standing on front platform; other companies provide in this rule for the operation of the front door by the motorman, also that he is required to pay attention to alarms from push buttons.

Our rule No. 376, exit door to be kept closed, reads:

"The exit door of front platform must not be opened while car is in motion and must be closed before car is started."

This seems to be a general rule.

Our rule No. 377, persons not allowed to board at front, reads:

"No person shall be permitted to board the car at front platform."

This is also general practice.

Some other rules for motormen provide for care in starting cars, that they shall be careful to see that the clothing of passengers alighting from car is free of doors, etc.; still other rules call attention to the duties required of motormen at terminals, and some companies specify the point at which cars shall be brought to a stop, that is, as regards relation to the cross walks.

In the various codes submitted to your committee, a number of conditions are covered under prepayment operation which our present code has not taken note of. Many of these apply to conditions in connection with the use of fare boxes and some of the subjects treated are, procedure to be followed when improper fares (counterfeit or mutilated coins) are deposited, the use of identification slips which conductors drop into fare boxes, rules covering entrance and exit passageways, the use of the "car full" sign, regulations where doors are used and the use of push buttons.

Your committee submits the above with the idea of having those members who are operating prepayment cars enter fully into the discussion of this section of the present code, as in the opinion of the committee it is at present incomplete and in need of considerable elaboration. Your committee feels, however, that it is inadvisable to attempt to suggest changes and additions without further information from the members and expressions as to the satisfaction derived from rules and regulations already in effect. It therefore recommends that the subject be continued another year, and hopes that the members, by full and free discussion of these prepayment rules, will provide information that will enable the 1913 committee to make some headway in the development of a set of rules that will adequately cover all phases of prepayment operation.

The Railroad Commission of California has in preparation a general order calling upon all railroads for monthly statistical reports.

OPENING MEETING OF THE ACCOUNTANTS' ASSOCIATION

The first meeting of the Accountants' Association was called to order by the president, P. S. Young, Public Service Railway of Newark, at 2:35 p. m. yesterday. Mr. Young asked the first vice-president, L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company, to take the chair.

Mr. Young then read the annual address of the president. This is published elsewhere in this issue.

As H. E. Weeks, Tri-City Railway, who has been the secretary-treasurer of the association for several years, was unable to be present, M. R. Boylan, Public Service Railway of Newark, who had been asked by the executive committee to act in the place of Mr. Weeks, served in this capacity. Mr. Boylan read the report of the executive committee, which was approved and filed. The report of the secretary-treasurer was then read by Mr. Boylan, and was approved and placed on file.

President Young announced that on account of sickness Prof. Mortimer E. Cooley, dean of the department of engineering of the University of Michigan, would be unable to be present to read a paper on the subject "Overhead Charges." The address on this subject made by Professor Cooley at the 1911 convention was discussed generally, however, by the association.

Mr. Young said that the entire subject of overhead charges needed ventilation. Lawyers and engineers acting for companies in cases of this character were often unable to agree on the total of the various elements of overhead charges. Such charges made up a large part of the total value of the property of public service corporations. Possibly the reason for this disinclination on the part of lawyers and engineers to make adequate allowances was the fact that until recently most amounts named had actually been underestimates of the totals to which the companies were fairly entitled.

It was the duty of accountants in these cases, Mr. Young continued, to show what the facts were. Many of the accountants knew that in reality overhead charges constituted a very large proportion of the total cost, and consequently of the total value of the property. In one case which was tried recently the attorneys who considered the subject of fair overhead charges as an element in the value of the property said that while they believed the overhead charges were very much greater than were actually claimed, they did not want to complicate the case, as they expressed it, by asking for an amount which seemed large, even though they believed that it was justified.

The paper by Professor Cooley had been read widely, Mr. Young added, and since last year he had heard from it from many sources.

W. H. Forse, Jr., Union Traction Company of Indiana, said that the value of a property was not measured by the physical property as it was seen. Many costs that did not appear on the surface were proper elements of the value and should be included in an appraisal. The element of obsolescence also should be taken into consideration. The electric railway property of to-day was really a conglomerate affair. In the early day the horse car was the only equipment known. This was succeeded by the cable car, and then the early fight with the initial electric cars followed. The expense of all of these classes of equipment had gone into the cost of the properties as they existed to-day.

L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company, said that while the question of obsolescence was sometimes considered in connection with the determination of the value of the property, he thought that it would be better if the companies could be permitted to charge higher rates so as to take care of this element through a provision for depreciation. It was much better to secure higher rates and to make provision through the operating expenses for depreciation as it developed and needed immediate attention.

President Young said that the overhead charge ought not to be confused with a charge for the development of the property. The term "overhead charge" as it was used generally did not include development cost.

F. B. Lasher, New York State Railways, said that it might be well to learn the ideas of members as to the basis on which overhead charges should be determined. In one case of which he had knowledge the percentage added on account of overhead expense had been fixed at 37 to 38, and in an experience of some months it had not varied from those figures. In this case a number of elements of expense rightly chargeable for overhead cost were added to the direct manufacturing expense and made up the aggregate percentages named.

Mr. Young spoke of the figures of percentage allowed for overhead charges named in the paper read by Professor Cooley last year, and said that if interest on construction was to be allowed it was important to add also an amount for interest on overhead charges for the period concerned.

Mr. Forse said that there was a danger that some items of charge might be overlooked. For instance, figures of cost of manufacturing special parts of equipment might be given to the general officials by representatives of the mechanical departments. If these should be analyzed, however, it would be found in some instances that with proper additions for overhead charges the company manufacturing on the strength of such estimates would actually be paying more than the expense of securing the same parts in the open market. This subject was well worth particular and constant study by the accounting and other interested departments.

H. S. Swift, Toledo Railways & Light Company, said that that company was greatly interested in the subject. T. L. Martin, of the same company, spoke of experiences he had had in the investigation of overhead charges. The investigation was made in connection with an inquiry by public accountants into the entire system of accounting of a large industrial establishment. The actual overhead charges added were from 100 to 110 per cent on productive labor. This was a subject of great importance in a railway shop.

Mr. Forse asked about the provision for the fluctuating item of productive labor.

Mr. Miller said that a definite fixed overhead expense was applied to every factory, and it gave a price which was much more like the normal selling cost of the item than the amount determined without allowance for overhead charges. He thought that the rate of overhead expense in a case of this character would not vary much in a year.

J. C. Collins, New York State Railways, said that the association should have an investigation of the subject of overhead charges by a committee, in order that the members might receive the benefit of the knowledge obtainable.

The meeting was then adjourned, and the association will re-convene at 9:30 o'clock this morning.

SOME TELEGRAMS

Fearing that the folks who were on the New York Central train would be lonesome, the entertainment committee of the Pennsylvania Special sent the following messages of cheer by telegraph:

To Frank Hedley: Regret delay to your train. Committee closing for two hundred double-deck cars or two centuries' supply. Meet us in Chicago.

Bill Red-Eye Sawyer: Condolences on failure transportation arrangement. Hope you are in good company.

Bull McConnaughy, Union Stock Yards, Chicago: Get Westinghouse exhibit up. Let rest go. Send relief party to New York Central train. Meet us morning nine with band.

To Charles C. Castle: Meet me arrival of your train LaSalle Hotel. Have new device under consideration. You must leave Sunday night for Memphis. Make no plans to remain in Chicago.

THE WESTINGHOUSE EXHIBITS

A very extensive railway apparatus exhibit is shown by the Westinghouse Electric & Manufacturing Company. Among the features that are of special interest are two large electric locomotives. Field control motors, type HL unit-switch control equipments for 600 volts and control equipments and motors for 1200 volts are shown in operation. Each equipment controls motors which are so arranged with a brake that they can be loaded, so that the actual operation of all the apparatus in service may be shown.

One of the fifteen Baldwin-Westinghouse locomotives that are being furnished the Southern Pacific Railroad for its Pacific Coast properties is shown. This locomotive is for high-voltage, direct-current operation and is designed for use in freight haulage and switching service, but may be used for passenger train service if necessary. This equipment has been described by this paper.

One of the thirty-nine Baldwin-Westinghouse electric locomotives that are now being furnished the New York, New Haven & Hartford railroad company is on exhibition. This road now has 100 Baldwin-Westinghouse locomotives in service. In construction the locomotive combines what have been shown in every-day road service to be the best features of heavy locomotives that have been built in the past.

An articulated running gear has been adopted, and also an eight-motor driving arrangement which consists of four twin-motor units (eight motors in all) with one twin motor mounted over each driving axle. Three of the thirty-nine locomotives now under construction are for alternating-current, direct-current operation, while the remaining thirty-six are for straight single-phase, alternating-current operation. The three a.c.-d.c. locotives are for fast freight and heavy passenger service. Each of these thirty-nine locomotives will exert a maximum tractive effort of 40,000 lb. Each locomotive is equipped with eight Westinghouse No. 409-C, 170-hp, 25-cycle, single-phase motors and type HB unit-switch control. All of these locomotives collect current at 11,000 volts, 25 cycles, single-phase, alternating-current from a catenary trolley wire by means of a pantograph trolley.

A 1200-volt HL control equipment and two No. 327-C, 600-1200 volt motors are shown in operation. Westinghouse 1200-volt control equipments have been furnished to the Piedmont Traction Company, the Pacific Electric Company, the Southern Pacific Company, the Oakland Antioch & Eastern Company and two other high-voltage, direct-current properties. Type HL control is particularly adapted to high voltages owing to certain of its inherent properties which assure positive rupturing of the high voltage arcs. The simplicity and accessibility of the apparatus insure low maintenance costs.

No. 327-C, 75-hp, commutating-pole, 600-1200-volt motors are used on the Southern Pacific Company's multiple-unit cars. The motor can be used in either 600-volt or 1200-volt service.

A complete equipment of Westinghouse 600-volt Type HL field control is shown in operation. Westinghouse unit-switch field control is being extensively used for all classes of service. With this type of control there is a saving in power consumption and a flexibility in the use of equipment, for larrge starting torques are possible with field control motors and only a short time is taken in resistance running. Also the same car and motor equipment may be used for city and suburban or local and limited interurban service with the same gear ratio.

Some users of unit-switch field control are the Pennsylvania Railroad Company, on thirty-three locomotives; the New York, New Haven & Hartford Railroad Company, the Public Service Corporation of New Jersey and the Pacific Electric Railway Company.

Other equipment shown includes the No. 307-C-4 commutating-pole, field-control, box-frame motor, the No. 306-CA, commutating-pole, box-frame motor and No. 333-C-2, commutating-pole, 600-1200-volt field-control motor.

This motor represents one of the recent developments in high-voltage d.c. railway motor construction and embodies also the field-control feature. The rating of the No. 333-C-2 motor is 100 hp at 500 volts, and 115 hp at 600 volts on normal field. This motor is of the box-frame type. The British Columbia Electric Railway, the Pacific Electric Railway and the Michigan United Traction Company are using this motor.

The No. 328 commutating-pole railway motor is the one that makes possible the low-step, light weight Pittsburgh Railways Company car. It is designed to fit in the clearances provided by 24-in. wheels and hence permits a low-car body and the consequent weight economy. This has been humorously termed the "dachshund" type, since its general appearance is similar to that of a certain breed of canine. The motor is long and drawn out along the shaft and small in diameter. This attenuated feature of construction was necessary in order to obtain space for material required for a motor of the desired capacity, since the maximum allowable diameter for the motor was restricted by the small diameter (24 in.) of the car wheel. The nominal rating of this motor is 30 hp at 500 volts. Its weight is 1484 lb.

A number of railway motor details which show some of the details of Westinghouse motor construction are exhibited.

OUTDOOR TRANSFORMER STATION

A typical installation illustrating the application of Westinghouse outdoor type transformers for transforming energy at minimum first cost and with maximum reliability is located near the track exhibit. The transformers are two 25-kva. O. I. S. C. units, high-tension voltage 22,000, low-tension voltage 2300. The units are connected in V for three-phase operation.

A 25-kw, 125-volt, direct-current turbo-generator, running at 4000 revolutions per minute, is typical of the line of Westinghouse direct-current units that are widely used for lighting service and for excitation of alternating-current generators.

ROLLWAY BEARING SERVICE

The Railway Roller Bearing Company, Syracuse, is exhibiting at spaces 237 and 239 a number of Rollway journal boxes and bearings, including the following: large journal boxes of the type which have just been delivered for the Northwestern Elevated Railroad of Chicago; 5-in. x 9-in. Rollway journal boxes for the Baldwin-Westinghouse electric locomotives of the type used on the Portland, Gray & Lewiston Railroad; a Third Avenue Railway storage battery box as installed on fifty-six cars; a roller-bearing box for the New York Railways storage battery car just delivered; a journal box for surface car operation in Paris, France, with double-ball thrust, placed within the box between the two lines of rollers; a Rollway car wheel inserted on non-rotating axle as used on the Federal storage battery cars. A number of boxes and bearings which have seen service are also shown. Among them are the following: A Rollway journal box with bearing parts which has operated fourteen months on the New York State Railways at Rochester, one of the eight original Rollway journal boxes showing bearing parts after three years' service on the Utica & Mohawk Valley Railway and later on the Philadelphia Rapid Transit lines; a GE-216 railway motor showing bearing parts after operating 3800 miles on the Syracuse Rapid Transit lines; a GE induction motor showing the bearings and parts after twenty-two months' operation at 900 r. p. m. in the Railway Roller Bearing Company's shop.

The Bemis Car Truck Company, Springfield, Mass., is represented at the convention by Warren L. Boyer. He states that his company has recently entered into selling arrangements with the Edgar Allen American Manganese Steel Company, to represent it in New England for manganese steel gears and pinions and manganese specialties.

A SIGNAL DEMONSTRATION

Schemes for obtaining the maximum use of a stretch of single track and at the same time insuring "absolute" signaling protection at a moderate cost are being demonstrated in a striking manner this year. Three working models, each consisting of a 20-ft. section of miniature track complete with turnouts and signals, showing just how through moves as well as meets are taken care of, are to be found in spaces 403-412 of the Union Switch & Signal Company in the South Straightaway.

The track, consisting of brass rails spaced at a 2-in. gage and provided with hand-throw switches, is divided into blocks with continuous track circuits; the signals are of two types—the semaphore and the light—the former in minature being actuated by concealed electro-magnets and the latter being brightly illuminated by small tungsten lamps. Cars passing over the tracks operate the signals automatically. One of the models illustrates the "absolute" system without preliminaries where but one train or car is allowed in the block at one time. A second model shows how the Illinois Traction System's signals work with preliminaries. Another model illustrates a very simple "permissive" scheme where following but not opposing moves into the block are provided for.

NEW U. S. SIGNALS

In addition to displaying its type G, K and K-2 signals the United States Electric Signal Company, West Newton, Mass., is showing among other new apparatus a full-size car-counting (up to and including fifteen cars) illuminated semaphore blade signal, known as type L-2, for single-track service. The blade, which is 2 ft. long, operates in three positions. It is illuminated at night by means of lamps which are installed in the main signal box. The company is also showing a new full-size type of interurban signal box and post with a three-position semaphore blade and a spectacle which carries the three-standard colored lenses corresponding to the semaphore positions. This signal is operated from insulated sections of rails, using the trolley voltage. Two posts and other apparatus, constituting a complete working block, are shown and operated in connection with a miniature track. This interurban equipment will be installed on the lines of the Terre Haute, Indianapolis & Eastern Traction Company immediately after the convention.

A new type of crossing alarm completes the novelties shown by this company. This alarm is operated either from an overhead contact or track circuit. The mechanism is exceedingly simple in construction and operation as it was designed to meet the need for a low-price crossing alarm.

NEW ALLIS-CHALMERS COMPANY TYPE AC-3 COMPRESSOR

With the advent of the light-weight stepless cars and a growing tendency on the part of the foremost railway engineers to cut down operating expense and mantenance cost by reducing the weights of cars, trucks, motors and air-brake equipment to a minimum, a demand has been created for an electrically driven air compressor which has minimum weight, occupies the least possible space and has maximum efficiency and output.

The Allis-Chalmers Company has recently developed a new compressor to meet this demand along lines which are a radical departure from the practice heretofore considered standard. This new compressor is designated as type AC-3 and has a displacement of 18 cu. ft. of free air per minute.

In this compressor gears are entirely eliminated, the armature of the motor being mounted directly upon the crank shaft. There are only two bearings, and these bearings are of very liberal area. The moving parts, including the main bearings, are lubricated by the splash of the connecting rods in the oil contained in the crank-shaft chamber.

The construction of the bearings and armature is such that it is impossible for any oil to get into the motor and its windings. The compressor has three cylinders, and the pistons are timed to give a very close approximation to a uniform turning moment at the crank shaft, thus equalizing the work over all points of the armature.

The sleeve-type intake valves are mechanically actuated by means of eccentrics on the crank shaft. This construction allows large intake ports, enabling the use of high speed at the crank shaft and reducing the noise of operation to a minimum.

The cylinder heads are independent and may be removed without disturbing the intake or discharge piping to the compressor. Access to the crank case may be had by removing the cover plate on the side opposite the cylinders. The crank shaft is made of high carbon steel and heat-treated. The connecting rods are of steel and are lined at the bearing points with phosphor bronze bushings.

The motor is a four-pole series-wound machine and is constructed throughout in accordance with the best modern railway motor practice. The armature is built on a sleeve which is keyed to and has a taper fit on the shaft. It is held in place with lock nuts, and the construction is such that it may be removed and another armature inserted ready for operation in less than five minutes, without removing the compressor from the car.

The commutator is built according to the best practice, the bars being of drawn section bored to fit commutator sleeve and insulated from each other with a good grade of mica. The insulation between the sleeve and the commutator bars consists of solid-molded mica cone rings. The design is such that the commutator is arch-bound according to the most approved commutator construction. The surface insulation distance is materially increased over usual practice on air-brake motors.

The brush holder and brush-holder insulation are particularly worthy of notice. A simple, convenient and reliable adjustment is provided for the tension of the brushes.

The armature coils are formed of comparatively heavy wire and extra allowance has been made for slot insulation. The material used in the construction of this compressor throughout has been very carefully selected for each particular detail. The weight of this compressor is 390 lb.

The motor is designed for a speed of 1150 revolutions per minute when pumping against an air pressure of 90 lb. per square in. The windings are for 600 volts. Exhaustive tests have been made on this machine which show the volumetric and over-all efficiencies to be exceptionally high.

CONSOLIDATION TROLLEY SWITCH AND SIGNAL CONCERNS

Preliminary negotiations have just been completed leading to the consolidation of three important and substantial trolley switch and signal concerns. These are the United States Electric Signal Company, West Newton, Mass., the American Automatic Switch Company, New York City, and the Nachod Signal Company, Philadelphia. The new consolidation will be styled the United States Switch & Signal Company. It will include in its organization the recognized signal engineering talent of the constituent companies, will have available its own well-equipped manufacturing plant and will command ample resources with which to manufacture and market improved signal apparatus designed particularly to meet the operating requirements of all classes of electric railway service. Roland F. Gammons, II, of the United States Electric Signal Company; Carl P. Nachod, of the Nachod Signal Company, and Ralph Sanger, formerly of Wonham, Sanger & Bates, have been largely responsible for these negotiations, and these it is understood will be substantially interested in the new company.

GENERAL ELECTRIC EXHIBIT

The exhibit of the General Electric Company, located in spaces 51-60, includes a number of new features introduced during the past year. Among recent developments the new Sprague-General Electric type MK control, designed for use on city cars, is displayed mounted on a rack in the relative position it would occupy on a car. The equipment on exhibition is suitable for four motors of 50 hp at 500 volts and is shown in operation. Through several improvements in design the number of contactors has been reduced.. These with the reverser and overload relay are mounted in one box under the car. This new MK equipment is all-electric in operation.

One of the greatest advancements in railway motor design since the General Electric Company introduced commutating poles is the self-ventilated motor. The new GE-200, GE-203 and GE-201 commutating-pole motors with the self-ventilating feature, rated respectively 32 hp, 40 hp and 50 hp on 500 volts and 38 hp, 50 hp and 60 hp on 600 volts, attract attention among the apparatus exhibited. One of the GE-203 motors is shown so as to facilitate inspection of its construction. These motors may be operated inclosed (at normal rating), semi-ventilated or fully ventilated. Through forced ventilation the weight per horse-power output has been reduced without sacrificing mechanical strength, durability or electrical efficiency. A separate armorized solid gear and armorized pinion for the GE-203 motor is also shown.

A straight-air brake equipment with the CP-27 air compressor is exhibited mounted on a rack ready for operation in the same manner as when installed on a car. The air compressor is provided with a glass cover to permit a view of the interior. An additional CP-27 compressor is shown so as to exhibit clearly details of construction. Separate valves entering into the equipment, including an SG straight-air motorman's valve, SF-4 motorman's valve with handle, EH-1 emergency valve, quick service valve, sectionalized magnet valve, variable release triple valve and variable release motorman's valve, form part of this exhibit. A number of miscellaneous car equipment devices are also shown.

A complete assortment of line material is grouped on a large frame in an attractive manner. Many of these devices are mounted in the same way as when they are installed in actual service.

A 600-volt d. c. aluminum cell lightning arrester for street cars shows some recent refinements of detail to insure easier inspection. There is also an interesting exhibit of luminous-arc headlights, including the 2-amp type with semaphore lens, which secures intense concentration of light, and 4-amp types with parabolic metal reflector or semaphore lens. During the past year improvements have been effected in the method of ventilating these lamps. For city running, dimming is accomplished by reversing the polarity or using incandescent lamps. Three types of steam-flow meters, the portable testing meter, indicating meter and recording meter, are exhibited in operation. These meters indicate the steam output of a boiler and tell quickly whether it is performing at its highest efficiency. The CP-28 portable air compressor supplies air for operating the steam-flow meters. This compressor finds very convenient use in power houses, railway shops, etc., where a supply of compressed air is needed for blowing out machines but where permanent installation with piping is not feasible.

Two types of ozonators are exhibited, the household and factory sizes. The ozonator deodorizes and sterilizes indoor air. Ozone diffused throughout a waiting room, basement, etc., quickly purifies the atmosphere. A battery-truck crane is also included in the G. E. exhibit. These trucks are being employed very effectively in railway work around repair shops, freight houses and terminal stations. This automobile battery truck, having an electric crane mounted on the front end, may be used both for hoisting and carrying loads and hauling trailers.

The company also announces that during the past year it has made several improvements in its commutating-pole rotary converters, such as standardization of the commutating-pole feature for various capacities and frequencies and standardization of the brush-raising device on rotaries started from the a. c. end. It has also developed 25-cycle and 33-cycle single machines for 1200-volt d. c. operation.

THE J. G. BRILL EXHIBIT

The Brill exhibit is located in the Arena Building at the right center and includes four remarkably interesting trucks. One of these is a huge interurban of the 27 M.C.B.-3 type —one of 120 recently ordered by the Boston Elevated Railway for the Cambridge subway division. The truck, which weighs 11,500 lb., has a number of improvements in the brake system, bolster chafing plates, side bearings and other details. The single motor truck No. 39-E has also been improved in a few details since the last convention. An interesting item in connection with the trucks is the fact that within three years over 6000 of them have been placed in service. The Chicago Railways Company has courteously lent one of its latest trucks of the 27-G.E.-2 type for the Brill exhibit, and as this is one of the most powerfully built trucks in straight city service operated by any of the large lines, it will be examined with interest. A truck of the new "Radiax" type had a crowd of visitors around it all day yesterday, as it is one of the most novel trucks in the show. Another novel feature of the Brill exhibit includes a self-ringing platform gong designed to be operated by a spring wound up from the brake lever. Pressure upon the pedal produces a steady, frequent stroke and at the same time a single stroke can be obtained. Those roads which have been carefully studying means of creating greater efficiency in car crews appreciate the value of relieving motormen of leg fatigue, and this device is in line with efforts in this direction. A folding double step for open cars, while not seasonable, will still interest operators of lines using open cars. As the arrangement is exceedingly simple and effective, a model is shown. A full-sized model of the new "Exhaust" ventilator also is shown and is being examined by many visitors. Six distinct types of Brill seats include several novelties, one of which is a non-reversible back type weighing only 35 lb., having no aisle plate.

In addition to those who have been reported previously as being in attendance at the exhibition of the Brill and subsidiary companies are J. W. Rawle, assistant general manager; R. B. Liddell, superintendent; C. F. Rice, superintendent of the Wason Manufacturing Company; F. C. Richards, from the San Francisco office; J. J. Warren of the Montreal office, and W. A. Lewis of the Winnipeg office.

The Goldschmidt Thermit Company's exhibit includes the Thermit process of welding rails in paved streets, Thermit motor case and truck frame repairs; Goldschmidt Thermit rail grinder for grinding rail joints and rail corrugations, showing the machine in actual operation; moving pictures illustrating the entire process of rail welding, marine repairs, Thermit repairs in locomotive shops, sample rail welds, sample roll neck repairs, Thermit system of pipe welding with numerous samples of such welds, sample mold rammed up as used in practice, samples of different kinds of Thermit, and metals free from carbon, including the Goldschmidt Thermit Company's carbon-free 25 per cent ferro-titanium. Transparencies are also exhibted showing work done throughout the world.

Among the Exhibits

The Griffin Wheel Company, Chicago, is exhibiting a full line of the F. C. S. chilled iron car wheels and is also showing broken castings of a number of types which show the depth and quality of chilling.

* * *

The W. R. Garton Company, one of the oldest street railway supply firms of Chicago, is showing samples of many of the car equipment and line material specialties which it handles. The exhibit occupies space 426.

* * *

The Corliss Carbon Company of Bradford, Pa., is exhibiting a generating set for determining the coefficient of friction of carbon brushes. It has a scleroscope instrument to test the hardness of brushes and is showing samples of brushes machined in different ways.

* * *

The L. Zink Company, Detroit, Mich., is showing in the booth of the Baldwin Locomotive Works, spaces 361-363, the Zink radius circle bar connection. This is a radius connection which prevents the brake rigging from being torn off and the car from being disabled when a truck splits a switch. Mr. Zink, who is in attendance, is also showing the Zink slack adjuster.

* * *

The exhibit of the Green Engineering Company, space 517, includes an operating model of K-type Green chain-grate stoker. The representatives are calling attention to the fact that in operation this stoker is a practical demonstration of progressive combustion, that it eliminates smoke, utilizes low grades of coal, reduces cost of operating labor, increases capacity and economy, is fully automatic in all functions and is low in maintenance cost.

* * *

The Anderson Brake Adjuster Company, Omaha, Neb., is showing in space 227 samples of the Anderson automatic slack adjuster in operation on a truck. Although this company has been making slack adjusters for the past five years, it was only a few months ago—after thorough reliability tests were run—that this adjuster was offered to the industry. Since then the Anderson adjuster has been placed on many cars and each installation has proved efficient in every way. The guarantees which the representatives of the company are making as to the reliability of the adjuster as well as to the economies effected in operating cars equipped with it are proving attractive to the delegates.

* * *

The exhibit of the Peter Smith Heater Company, Detroit, Mich., consists of that company's economical forced-ventilation hot-air car heaters. In addition to the coal-burning type of hot-air heater which has been made standard on more than 200 electric railways during the past two years, this company is showing the new electric hot-air heater which has been especially designed for use where unusually low prices for electricity prevail. The facts and figures of the economy and reliability of the hot-air heaters—as depicted by the mythical character Hotfoot Smith through the advertising pages of the ELECTRIC RAILWAY JOURNAL during the past few months—are being supplied to visitors interested in ways of keeping cars heated to a temperature of 60 deg. in even the coldest weather.

* * *

Northey-Plummer, Limited, of Indianapolis, Ind., is exhibiting the complete equipment employed in the Simmen signal system, including an automatic stop. The exhibit includes the dispatcher's board with the automatic graphic recorder. The board comprises ten switches, nine of which are connected to third-rail sections on a miniature railroad, while the tenth operates a cab signal. Although to all appearances the engine and cars are propelled by steam, the motive power is electric. The engine is equipped with a contact shoe which operates the graphic record. In connection with the cab signal mechanism, which is mounted on a car, the automatic stop device has been included. The operation of the automatic stop is shown by connecting it to a small electric motor. This motor is connected to the tachometer, which controls the automatic stopping mechanism. An electric master clock which is built especially for the Simmen signal system is also a part of the exhibit.

* * *

The Johnson Fare Box Company is exhibiting in spaces 518 and 520 its standard types of registering fare boxes for cash fares and a new design for handling tickets as well as coins. In this device the coins and tickets are deposited in separate openings—the coins entering a series of holes, falling through a channel to the coin examination plate and passing through the counting mechanism to the cash drawer, where they are accessible for making change. The tickets enter a separate slot, fall on a ticket examination plate and pass through a canceling mechanism into a locked compartment. There is also shown a registering fare box combined with a double-faced car register designed for operation on center-entrance cars.

* * *

The American Automatic Switch Company is exhibiting its latest type 15 automatic track switch at its booth, space 427. This device has only two wires running from the line contactor, and this contactor has some radical improvements over the older type. The contactor is not only installed without taking up slack in the trolley wire, but there is no wood used in the construction and the trolley wheel does not jump over gaps. Hammering, bouncing and arcing are said to be eliminated in this design. Not being compelled to take up slack makes it possible to install the contactor in a very short time and dispense with a strain which might buckle the contactor.

* * *

The Buda Company, Chicago, is exhibiting a solid manganese-steel switch with an enlarged circular heel. The feature of this piece of special track is found in the adjustment which is within the limits of the switch body itself. The tongue may be adjusted through a vertical segmented wedge which provides for hold-down and also allows adjustment for taking up horizontal wear. This type of tongue is shown in both solid manganese and hard-center construction. The special features of the Buda automatic reversible spring box which is shown in connection with the solid manganese tongue are its simplicity in construction, automatic operation and positive action. It is adapted to any type of tongue switch, and the mechanism is so installed in the malleable-iron box that all parts may be removed and cleaned quickly . This company is also showing a manganese plate crossing and frog of the same type as are used on the Chicago surface railways. The plate is positively set so that it will not loosen under severe service.

* * *

The H. W. Johns-Manville Company, at spaces 128, 130, 132, 134 and 136, has on exhibit a very complete line of J. M. fiber conduit with fittings. This conduit is used by street railways in connection with the installation of underground systems. There is also a complete line of "Noark" protective devices, including car fuse boxes and fuses of special designs. Samples of J. M. ebony asbestos wood are also displayed. This is a substitute for slate or marble, used in connection with high-tension switchboards. Other features of the exhibit are line insulators, trolley ears, trolley retrievers, lightning arresters, J. M. friction tapes and splicing compounds and an assortment of molded insulating materials. An important feature of this exhibit is the Audiffren-Singrun refrigerating machine. This is a small, efficient and particularly simple refrigerating and ice-making machine for use in residences, hospitals, clubs, etc., and is operated by from ½-hp to 4-hp motors, depending upon the cooling or ice-making requirements. It simply requires the opening or closing of the switch to stop or start the machine.

Henry Gulick, of the Gulick-Henderson Company, Pittsburgh, Pa., is attending the convention again this year.

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The Cheatham Electric Switching Device Company, Louisville, Ky., is showing in space 359 the "Cheatham switch" and calling the attention of delegates to the large number of these that are in operation on the lines of the Chicago street railways.

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In spaces 526-528 at the right of the main hall the Consolidated Car Fender Company, besides the standard Providence fenders and wheelguards and the Mellen snow broom, is exhibiting the H-B lifeguard. The Consolidated Car Fender Company recently secured an exclusive license to manufacture and sell the H-B lifeguard in North and South America.

* * *

The Whittier Mills Company, of Chattahoochee, Ga., is showing an exhibit of Spiral waterproof trolley cord, from the cotton field to the finished product, including different operations through which the fiber passes. The booth is decorated with growing cotton. A most interesting rug (10 ft. x 12 ft.) is also shown, which was built and designed on a special loom constructed at this company's plant from Spiral waterproof cord.

* * *

In space 138 in the arena balcony the American Mason Safety Tread Company has a neat exhibit of all types of safety treads and Karbolith flooring. The stairway leading to the balcony is equipped with Mason lead-filled treads. The new part of the exhibit is the Stanwood car step. The business good-will, machinery and all rights to manufacture and sell the Stanwood car step were recently secured by this company. It is interesting to note that the company has furnished to the Pennsylvania Railroad, at the Altoona shops, over 300 tons of Karbolith flooring.

* * *

Among the interesting features of the exhibit of the National Carbon Company, Cleveland, at space 15, are a large number of carbon brushes illustrating the character of wear on brushes that have not been properly installed or are misused. Samples are also shown as examples of large mileage which may be obtained by brushes installed under proper conditions. The new La Clede 255-G generator brush, which has been put on the market this year, is being exhibited. Visitors are presented with cards describing common causes for brush and commutator troubles.

* * *

The Falk Company, Milwaukee, Wis., is showing in its exhibit, spaces 352-354, a solid cast-steel frog made of open-hearth steel with a bolted manganese center. This type was designed particularly for the Chicago City Railway Company, which company used a large number of these frogs in rehabilitating its lines. The representatives of the company in charge of the booth are also calling particular attention to its new type of manganese center and mate with enlarged heel tongue and adjusting device. This type of switch is also shown in solid manganese.

* * *

The Vixen Tool Company, Philadelphia, Pa., in order to demonstrate the efficiency of the Vixen file is making comparative tests of the Vixen and ordinary commercial files on the Herbert file-testing machine, which is a standard machine for file testing which automatically tests files and draws a diagram, indicating exactly the total cubic inches filed away and the sharpness (rate of cutting) and durability (in number of strokes taken before file ceases to cut). All files are tested on this machine under uniform conditions. In addition to this, a demonstration of the Vixen file is also being made on bench work. One of the features of the bench demonstration is placing a combination block of steel, aluminum and copper in a vise and filing all three metals at the same time. The manner in which the Vixen cuts these three metals at the one time is interesting. The secret of the efficiency of the Vixen is the shape of the tooth, the high grade of steel used in its manufacture and the fact that each Vixen is sharpened before being placed on the market.

* * *

The McGuire-Cummings Manufacturing Company, Chicago, Ill., is showing in the track exhibit a combination interurban car. This car is 48 ft. in length and is mounted on McGuire-Cummings 20-A special truck. It is of plain sanitary design, finished in golden oak, has an arch roof and is equipped with the builder's standard ventilators. The passenger compartment has a seating capacity of thirty-four. The seats are upholstered in leather with head roll and arm rest. The baggage compartment is equipped with collapsible seats. The car is built for single-end operation and is equipped with McGuire-Cummings radial couplers.

* * *

The Midvale Steel Company, Philadelphia, has on exhibition a 33-in. one-wear rolled-steel wheel, 1 5-16-in. thick, designed for city service, which will appeal strongly to those without facilities for restoring contours. For interurban roads 34-in. rolled-steel wheels with rims 4 11-16 in. wide by 3 in. thick are shown. This company has recently designed a 22-in. pony truck wheel of rolled steel for use in maximum traction trucks. This wheel is also on exhibition. Among their other exhibits are splendid specimens of heat-treated axles and armature shafts. A rolled-steel forged gear blank is another specimen of the company's product.

* * *

The Kerwin Machine Company, Detroit, Mich., is giving practical demonstrations of the effective work that can be done on rails with the Kerwin-Detroit rail grinder. Since this machine was first placed on the market, about eighteen months ago, orders have been received from many of the leading railways as well as many of the smaller railways of this country. Three of these machines are in use day and night on the tracks of the street railway companies of Chicago. The representatives in charge of the exhibit are well supplied with data regarding the cost of operation and have many interesting facts to relate to visitors concerning the efficiency of the grinding machine when used to grind down high joints and grind out low and battered joints and corrugations. They state that the life of track can be prolonged from three to six years by using the Kerwin-Detroit rail grinder.

* * *

The Carnegie Steel Company has made a decided change in the general form of its exhibit and instead of the large quantity of heavy material formerly displayed has arranged its space more as a reception room. There still remains in the general layout enough material to show the special lines with which the railroad public is familiar. Steel cross ties have come to be standard in many cities for tracks in paved streets, and the model piece of track exhibited illustrates the method commonly employed in connection with concrete construction. It is estimated that the cost of this type of construction is no more than that of the best types of wood-tie construction, while the seven years' service under severe conditions fully proves all claims made for steel ties. There are in the United States 300 miles of steam road and 300 miles of electric road laid with these ties. A pair of 34-in. interurban Schoen steel wheels mounted on a 5-in. by 9-in. motor axle and a 33-in. single-life Schoen wheel make up the wheel portion of the exhibit. A forged and rolled-steel gear blank and a gear cut from one of these blanks show typical pieces of this new and increasingly popular product. A representative exhibit of steel sheet piling, both United States type and Friestedt, calls attention to this product. Vanadium steel is covered by test pieces, fractures, etc., illustrative of its properties. The stretch of track on which the display cars are shown is laid on Carnegie steel ties.

The Edward P. Wisch Service, of New York, is represented at the convention by Mr. Wisch himself.

* * *

An exhibit of Mathias Klein & Sons' electricians' and linemen's tools is shown in connection with the Western Electric Company's exhibit at space 414.

* * *

Arthur S. Littlefield, Yale 1912, has assumed certain responsibilities with the Lorain Steel Company and has become attached to this company's Chicago office.

* * *

The Standard Coupler Company, of New York, has a working exhibit of the shim brake-slack adjuster in space 262. Mr. Wilberforce Eckels has recently joined the sales force of this company. The many friends of George A. Post, the president of the Standard Coupler Company, will be glad to learn that he will be at the convention not later than Wednesday.

* * *

F. O. Grayson, formerly general sales agent of the St. Louis Car Wheel Company, now has a railway supply business of his own. In addition to a large assortment of good friends, his new line includes a manufacturers' agency for everything required in the operation and maintenance of the rolling stock and roadbed of street railways. The Grayson Railway Supply Company has offices at 405 La Salle Building, St. Louis. Mr. Grayson is attending the convention and incidentally interviewing his friends.

* * *

"The Trail of a Pioneer" has been published by the American Engineering Company in connection with its installations of Taylor stokers in street railway and other plants throughout the United States. It gives a photographic record of fourteen of the prominent and representative plants among the several hundred which have been fitted with Taylor stokers. Photographic and blueprint records of applications of this stoker in electric railway and other properties all over the United States and Canada may be seen at spaces 246 and 248.

* * *

The Railway Track-Work Company, Philadelphia, is exhibiting its newest type of reciprocating track grinder in operation. This machine is equipped with a silent chain drive. There are also other important changes and improvements embodied in this machine. The company is showing samples of the work done by the machine by means of motion pictures projected on a screen, illustrating the feature of portability. The pictures demonstrate the passage of a car in less than sixty seconds, counting from cessation to resumption of grinding.

* * *

The Charles N. Wood Company, of Boston, Mass., located at space 411, is exhibiting the Chapman automatic signal. This is a counting signal designed especially for use on electric railways where speed does not exceed 30 miles or 35 miles per hour. All indications, both by night and day, are given by a three-position semaphore arm, painted red and illuminated at night. A white background placed back of the arm serves to bring out the signal positions very clearly. Each car before entering a section receives a positive indication from the semaphore arm before it can proceed, and as many cars as have entered must leave the block before the signal can be restored to normal condition.

* * *

The Ohmer Fare Register Company has a new recording and printing fare box for P. A. Y. E. service and is showing it at spaces 501 to 505. Some of the attractive points of this box are that it requires small space and few movements by conductor or passenger. The payment of fares is fully under control and the register can be operated accurately with rapidity. It is designed on the cash register principle and the operators do not have access to the printed record. The box is 9½ in. wide, 11 in. long and 43 in. high. It indicates, records and prints, separately, from two to five different classifications of fares, and is furnished with or without the printing time feature. It also prints the identification key number of each conductor, the trip number, the direction in which the car moves, the number of the machine, the line number, etc. It is provided with a separate compartment for each class of fare. The conductor has access to these compartments. The cash is distributed into a cash till, from which he readily makes change. This recording and printing fare box is arranged to be operated with one movement, by either the hand or foot, at the option of the conductor.

* * *

In the new type M box which the Wharton people have on exhibition in their spaces 336 to 344 simplicity is the main feature, all small or fast-wearing pieces being entirely avoided. Naturally some wear will take place in the moving parts, but these parts are of such shape that the wear is taken up automatically by the parts themselves. In the new Wharton box the spring is so arranged that it will adjust itself to the proper tension automatically in any of the three positions. The Wharton people have adopted this device as their standard and will hereafter furnish it on their switches where such a device is called for. The one they have on exhibition is open for inspection and the Wharton representatives will be glad to show it to those interested.

* * *

The Standard Motor Truck Company's exhibit consists of six double trucks and several detailed parts showing the company's latest improvement in truck construction. The spring-clamped brake hanger which has come into very extensive use and which was first invented and patented by W. G. Price, engineer of this company, is shown in its various forms, including the parabolic or half-ball type. The company also shows a single-roller lubricated side bearing, which is protected from grit and requires oiling only once a year. A new brakeshoe key is shown which holds the shoes rigid in the brakehead and thus prevents noise and wear of the brakehead. This improvement is thought to be a valuable one. A new large catalog is shown which is very complete. It is printed in colors and gives much detail information useful for those who operate these trucks.

* * *

The Standard Roller Bearing Company, Philadelphia, has an attractive display in space 229, Machinery Hall. The exhibit includes annular ball and roller bearings, ball and roller thrust bearings, taper roller bearings, steel and bronze balls and roller-bearing car journals in the various sizes and styles in regular daily service under storage battery cars, city and interurban cars and steam railroad coaches. A pair of 36-in. steel-tired wheels carried on 5-in x 9-in. journals is mounted in roller-bearing journal boxes. The ease with which they can be turned is a clear demonstration of the results to be obtained through the use of anti-friction bearings. Those interested in steels and their proper heat treatment will inspect with interest the "fractures" on exhibit. With the exception of a few pieces made up to show the effect of varying temperatures in heat treating the same steel, the fractures have all been secured from stock pieces. Among the annular and taper bearings exhibited are some new bearings and new features. An annular ball bearing is shown in which approximately 50 per cent more balls are said to be used than in other bearings of the same size. The additional balls materially increase the load-carrying capacity and the life of the bearing. Annular roller bearings are also shown which are interchangeable with annular ball bearings. The use of rolls instead of balls approximately doubles the load-carrying capacity and results in a bearing particularly adapted for use in installations which subject bearings to shock. A new pressed-steel cage is shown for taper roller bearings. This cage is stiffer and more durable than a built-up cage and at the same time is so constructed as to form an excellent means of carrying lubricant to the rolls and cone of the bearing. It presents highly interesting features of construction.

List of Exhibits

Acme Indicator Company, Cleveland, Ohio, space 625. Street or station indicators. Represented by F. N. Bendelari, T. W. Small, O. C. Johnson.

Edgar Allen American Manganese Steel Company, Chicago, Ill., space 231. Electric special ground gears and pinions. Represented by Walter H. Evans, Walter S. McKee, M. B. Myers, E. S. Black, B. F. Clark.

Allis-Chalmers Company, Milwaukee, Wis., spaces 33-35. Air-brake equipments on racks, new high-speed car compressor, air-brake parts and accessories, steam turbine model, portable motor-driven compressor, transformers, motors, controllers, and view of steam engine, gas engine, steam turbines, hydraulic turbine, rotary converter, generator, motor generator and switchboard installations. Represented by C. A. Tupper, J. W. Gardner, F. Von Schlegel, H. W. Cheney, I. L. Dimm, W. R. Crawford, J. T. Cunningham, A. W. Burns, E. Dryer, S. R. Kerr and C. M. McDonald.

American Association of Creosoted Wood Paving Manufacturers, Chicago, Ill., car exhibition track. Section of track showing creosoted block paving construction. Represented by James Adkins Jr., A. H. Noyes, F. M. Barnard.

American Automatic Switch Company, New York, N. Y., space 427. Two complete type No. 15 electric track switches. Represented by Fred H. Osborn, Roy V. Collins, Ralph Sanger.

American Bitumastic Enamels Company, Philadelphia, space 349. Specimens of Bitumastic enamel and solutions for preserving steel and iron and waterproofing concrete. Represented by H. W. French, H. S. Lippincott, W. T. Riley.

American Brake Shoe & Foundry Company, Mahwah, N. J., space 364. A. E. R. A. standard brake shoes and brake heads, steel back shoes of the special electric, Streeter, Diamond "S" and composition-filled types, illustrating the American electric railway practice. Represented by J. B. Terbell, Frank L. Gordon, F. W. Sargent, J. G. Tawse, L. R. Dewey, C. P. Wright, P. M. Vilas, E. L. Janes, E. B. Smith, R. L. Brower.

American Car & Foundry Company, Chicago, Ill., spaces 519, 521, 523, 525, 527. Loose street car wheels, loose street car axles, street car wheels mounted on axles. Represented by W. C. Dickerman, C. D. Eaton, J. M. Keller, Scott H. Blewett, C. P. Dickerman, Andrew Speirs, C. McCormick, B. M. Carr.

American Engineering Company, Philadelphia, Pa., spaces 246 and 248. Taylor gravity underfeed stoker. Represented by M. Alpern, J. F. Mallory.

American Infusion Steel Process Company, New York, N. Y., space 251. Articles showing results obtained on various grades of steel by use of "Stelpro," a scientific hardening compound. Represented by Alfred J. Thompson, William C. Whyte, A. Willer, P. D. Johnston.

American Mason Safety Tread Company, Boston, Mass., space 138. Mason safety treads, Empire carborundum treads, Stanwood treads, Karbolith flooring. Represented by Henry C. King, M. H. Eddy, R. C. Davison.

American Railway Supply Company, New York, N. Y., space 624. Cap badges, breast badges, buttons. Represented by Charles Lounsbury.

American Steel & Wire Company, Chicago, Ill., spaces 315, 317, 319, 321. Crown, United States, twin terminal, soldered and soldered stud rail bonds; rail-bonding tools shown in operation on a section of track; trolley wires and samples of different kinds of electrical wires; right-of-way fences and steel fence posts. Represented by George A. Cragin, C. S. Knight Jr., F. A. Keyes, Ben H. Ryder, C. P. Vaill.

American Surety Company of New York, New York, N. Y., space 117. Advertising literature. Represented by George J. Arnold.

Anderson, Albert & J. M., Manufacturing Company, Boston, Mass., space 70. Aetna insulation line materials, trolley wheels, switches, automatic time switches and Sprague rotary sander. Represented by J. M. Anderson, W. W. Hincher, Ernst Woltmann, G. B. Crane.

Anderson Brake Adjuster Company, Omaha, Neb., space 227. Automatic slack adjuster. Represented by Wilson A. Austin, Charles O. Anderson.

Archbold-Brady Company, Syracuse, N. Y., space 110. Model of tower for electrical transmission wires, photographs and prints of installations. Represented by W. K. Archbold.

Atlas Railway Supply Company, Chicago, Ill., space 602. Atlas special joints, Atlas tie plates, Atlas rail braces, Fancher track grinder. Represented by J. G. McMichael, D. Thomson.

Automatic Signal & Appliance Company, Cleveland, Ohio, space 422. Spacing signals, block signals, crossing bells working in connection with trolley contactor. Represented by James B. Hoge, Charles W. Ward, G. H. Nierman.

Automatic Ventilator Company, New York, N. Y., space 249. Demonstration of natural, or self-acting, intake and exhaust system, by means of miniature car equipped with automatic ventilators; samples of several types of "monitor" and "arched-roof" equipments. Represented by George H. Ford, William J. Fleming, Jr.

Baldwin Locomotive Works, Philadelphia, Pa., spaces 361 and 363. City truck, class 48-14 H-2; interurban truck, class 78-22 A; interurban truck, with motors, class 79-25 A, and Vauclain centering side bearing. Represented by Charles Riddell, C. F. Dodson, S. A. Bullock, W. R. Lee and W. H. Bentley.

Bayonet Trolley Harp Company, Springfield, Ohio, space 245. Roller-bearing trolley base with detachable pole clamp, detachable trolley harps, bayonet special trolley wheels, semi-rotary sleet cutters. Represented by R. A. Garlough, C. S. Olinger.

Berry Brothers, Ltd., Detroit, Mich., space 30. Samples of gum copal, large panels of wood finished with railway varnishes and finishes; wood stains and panels showing railway black varnishes. Represented by D. W. H. Moreland, Walter E. Paye.

Blocki-Brennan Refining Company, Chicago, Ill., space 627. Carboxide elastic metal preserver. Represented by James C. Cleary, Gordon E. Douglas, Glenn E. Plumb, Rudolph Bracker, W. F. Brennan.

Boss Nut Company, Chicago, Ill., space 214. Full line of lock nuts, both square and hexagon. Represented by J. T. Benedict, J. A. MacLean, Ed. Wilhelm.

Brill, The J. G., Company, Philadelphia, Pa., spaces 20, 22, 24, 618. Truck No. 27-GEI, one "Radiax" E1 truck, No. 39-E truck, one No. 27-MCB3 truck, roll-top plush seat, leather-covered three-part back seat, cane and wood seat, 18-in. back "Winner" seat, cherry slat seat, stationary rattan-covered seat, lined and unlined rattan, model brake hangers, "Dumpit" sand box, "Dedenda" gong, folding gate, brake handle, springs, exhaust ventilator, steel platform knee, track scraper, self-ringing gong. Represented by S. M. Curwen, W. H. Heulings Jr., S. T. Bole, G. M. Haskell, J. Elwood Brill, G. H. Tontrup, Fred Brill, E. Bronenkamp, R. H. Thompson, D. B. Dean, H. E. Smith, C. F. Johnson, S. M. Wilson, F. L. Markham, S. K. Colby, J. A. Dawson.

Buda, The, Company, Chicago, Ill., spaces 308, 310, 324, 326. Switches, mates and frogs in manganese center and solid manganese construction, automatic reversible boxes and anti-kickers for tongue switches, switch stands, switch rods, track jacks, gasoline motor car, solid manganese steel crossing, manganese center crossing. Represented by W. P. Hunt Jr., H. S. Evans, R. B. Fisher, F. W. Marvel, D. C. Smith, H. C. Beebe, Lawrence Hamill, J. T. Harahan Jr., E. Johnson, W. Krause, J. Bernstein.

Buyers' Index Company, Chicago, Ill., space 116. Represented by F. B. Cozzens.

Cambria Steel Company, Johnstown, Pa., space 357. Cambria special heat-treated axles, Morrison guard rail, 100 per cent joints and rail joints. Represented by J. Leonard Replogle, A. Morrison, Clifford J. Ellis, Merrill G. Baker.

Carnegie Steel Company, Pittsburgh, Pa., spaces 307, 309, 311, 325, 327, 329. Track constructed with 100-lb. A. S. C. E. rail, Duquesne joints and steel cross ties, 33-in. rolled steel wheel, 34-in. rolled steel wheels mounted on axle, Duquesne rail joints showing various treatments, test specimens of vanadium steel, special rail sections and steel piling, rolled steel gear-blank. Represented by Waldo Berry, Robert Coe, L. W. Conroy, C. B. Friday, W. B. Gresham, N. M. Hench, R. P. Hutchinson, J. H. McAlarney, Edwin S. Mills, H. W. Maxson, John C. Neale, K. E. Porter, C. F. W. Rys, N. B. Trist, H. P. Tieman, C. R. Vincent, W. Williams,

George W. Landrus, H. van Zandt, H. L. Baker, J. B. Arnold, P. W. O'Brien.

Central Electric Company, Chicago, Ill., space 609. Okonite products, battery holders, high-voltage insulators, shop receptacles, plugs, etc. Represented by J. M. Lorenz, R. N. Baker J. S. Harley, R. S. Kacin, T. C. Ringgold.

Chapman Valve Manufacturing Company, Indian Orchard, Mass., space 218. Flanged-end outside and inside screw medium and standard pressure gate valves, bronze gate valves, screw-end bronze check valves, parallel seat steel valve, wedge gate steel valve for superheated steam, standard valves, electrically and hydraulically operated gate valve; blow-off valve. Represented by James McC. Moffett, J. C. Eardley, William G. Merritt, H. L. DeWolff.

Cheatham Electric Switching Device Company, Louisville, Ky., space 359. Electric track switch. Represented by J. A. Stewart, E. S. Olmsted, R. V. Cheatham, J. D. Augustus, Samuel Bowman.

Chicago Pneumatic Tool Company, Chicago, Ill., spaces 250, 252, 254. Duntley electric track drills, spike drivers, grinders, portable tools and a complete line of pneumatic tools. Represented by C. B. Coates, A. C. Andresen, Thomas Aldcorn, G. H. Barden, C. H. Schumacher, A. M. Andresen.

Chicago Railway Equipment Company, Chicago, Ill., space 67. Creco lubricated side bearings; Creco, Monarch and Sterlingworth brake beams, Creco slack adjusters, Franklin tri-partite steel pole for overhead construction, samples of rolled sections and concrete bars, miscellaneous malleable castings. Represented by F. T. DeLong, C. H. Williams Jr., E. A. Le Beau, Edwin F. Leigh, John C. Haswell.

Chicago Varnish Company, Chicago, Ill., space 660. Panels treated with the "Ce Ve" process of car painting. Represented by A. C. Morgan, G. S. Bigelow, Fred Gundrum, George G. Porter, Fred Olds, Robert Knox, Robert Buckman.

Cincinnati Car Company, Cincinnati, Ohio, space, exhibition car track. One steel side-entrance car. Represented by H. C. Ebert, W. H. MacAlister, Robt. Dunning.

Cleveland Frog & Crossing Company, Cleveland, Ohio, spaces 312-322. Hard-center manganese special track work, switch stands, photographs of Kerwin portable crossover. Represented by G. A. Lucas, George Stanton, L. G. Parker, George Arnold, W. F. Moore, J. T. Ruggles, George A. Peabody, S. Balkwill.

Cleveland Trolley Wheel Company, Cleveland, Ohio, space 118. A new trolley wheel. Represented by S. L. McAdams, E. E. Beam.

Consolidated Car Fender Company, Providence, R. I., spaces 526, 528. Providence car fenders and H-B wheelguards. Represented by Albert J. Thornley, George H. Hollingsworth, R. L. MacDuffie, A. J. Pizzini, H. E. Oesterreich.

Consolidated Car-Heating Company, Albany, N. Y., spaces 101, 103, 105, 107, 109, 111, 113, 115. Door operators (manual type for folding and sliding doors, compressed-air type with push-button switch for remote control, pneumatic car step and trap-door operators, air governor); all-steel ventilated spindle electric heaters for 600 to 1800-volt operation, quick-break knife switches and panelboards, electric ventilating heaters, coal-burning ventilating heater, thermostatic regulator for automatically controlling car temperature, electric hot-water heaters, buzzer and light signal systems, battery charging relays, tilting heat deflector, highway crossing signal, electric gong ringer, electric couplers. Represented by C. C. Nuckols, James F. McElroy, W. S. Hammond Jr., Thomas Farmer Jr., H. L. Hawley, M. C. Carpender, J. H. McElroy, C. A. Eggert, T. N. Bishop.

Continuous Rail Company, New York, N. Y., space 137 and exhibition track. Electrical rail-crimping machine, section of continuous rail. Represented by Walter Del Mar, Edgar Rhodes, John Noll.

Corliss Carbon Company, Bradford, Pa., space 223. Railway motor brushes, generator brushes, machine for determining coefficient of friction of brushes, scleroscope instrument to test hardness of brushes. Represented by Otto Koch, Alfred Mullhaupt Jr.

Crouse-Hinds Company, Syracuse, N. Y., space 511, 513. Arc headlights, both carbon and luminous types, incandescent headlights, both flush and surface types; condulets for car wiring, condulets for all types of open conduit wiring, panelboards and cabinets, knife switches, harpoon guy anchor, adjustarods, roundhouse reflectors. Represented by A. F. Hills, F. F. Skeel, D. C. Gidley, C. Dubsky, Frank Buchanan.

Curtain Supply Company, Chicago, Ill., spaces 26, 28. Car curtains, ring curtain fixtures, "Rex" all-metal rollers, "Rex" steel sash balances, etc. Represented by W. H. Forsyth, R. F. Hayes, S. W. Midgley, George E. Fox, F. M. Egolf.

Curtis & Company Manufacturing Company, St. Louis, Mo., spaces 360-362. Trilby section switch, mate and frog, crossover, Trilby section single crossing, T-rail mate of very heavy section, steam over electric crossing and several other small items, all of solid manganese steel. Represented by J. H. Steedman, F. N. Rumbley.

D & W Fuse Company, Providence, R. I., space 418. Deltabeston armature and field coils, Deltabeston wire, magnetic chucks, high and low tension D & W fuse boxes. Represented by H. F. MacGuyer.

Dalton Adding Machine Company, Poplar Bluff, Mo., spaces 120, 122. Dalton adding, listing and calculating machines, including hand-pull machines, electric drives and machine with motor equipped with automatic cut-off. Represented by James L. Dalton, P. N. Sea, C. S. Buchanan, L. E. Keller, W. I. Currie, G. A. Merritt, A. W. Rockwell, S. P. Child.

Dayton Fare Recorder Company, Dayton, Ohio, spaces 12, 14 and car on exhibition tracks. Dayton fare recorder, four-fare machine for city use with sample installations on different types of cars, viz., ordinary type, prepayment and near-side; Dayton interurban recorder, a twenty-four-fare machine for use on interurban lines, with sample installation showing method of operation. Represented by H. N. Ransom, W. I. Ohmer, A. G. Mitten, D. B. Whistler.

Dearborn Drug & Chemical Company, Chicago, Ill., space 61. Reception booth. Represented by J. W. Harkins, George R. Carr, Fred S. Hickey, Paul T. Payne, A. S. Cooke.

Joseph Dixon Crucible Company, Jersey City, N. J., spaces 16, 18. Graphite lubricants, Dixon's silica graphite paint and graphite specialties for various uses, also a set of gears which have run 150,000 miles, lubricated with Dixon's graphite wood grease. Represented by L. H. Snyder, H. W. Chase, J. A. Condit, C. D. McIntosh, F. R. Brandon, E. R. Smith, W. B. Allen.

Drouve, G., Company, Bridgeport, Conn., space 205. Antipluvius puttyless skylights, straight-push sash operator. Represented by William V. Dee, R. S. Adam.

Duff Manufacturing Company, Pittsburgh, Pa., space 264. Barrett track and automatic lowering jacks, Duff ball-bearing screw jacks, Barrett motor armature lifts, Duff-Bethlehem hydraulic jacks. Represented by E. A. Johnson, G. E. Watts.

Duplex Metals Company, Chester, Pa., space 409. Copper-clad trolley wire, copper-clad strand, copper-clad line wire, bare and weatherproofed for signal lines. Represented by C. B. Semple, A. D. Rummell, B. F. Cameron, S. C. Munoz.

Edwards, O. M., Company, Syracuse, N. Y., space 23. Window fixtures, metal trap doors, all-metal shade rollers, padlocks, steel furniture. Represented by Edward F. Chaffee, C. H. Rockwell, W. C. Bradbury, T. P. O'Brian.

Egry Register Company, Dayton, Ohio, space 135. Egry train-dispatching registers, Egry railway way-billing manifolders. Represented by Milton C. Stern, John Moore.

Electric Railway Equipment Company, Cincinnati, Ohio, space 424. Complete line of combination lighting and trolley poles, overhead line material, mast arms, brackets and pole fittings. Represented by W. A. McCallum, A. L. Johnston.

Electric Railway Improvement Company, Cleveland, Ohio, spaces 206, 208. Electric weld rail bonding car in operation, rail bonds, bond guards, bond clips. Represented by W. E. Huber, Gerald Howatt, M. T. Stanton, J. A. Bell, E. E. Schmid.

Electric Railway Journal, spaces 2, 4, 6, 8, 10. (See under McGraw Publishing Company.)

Electric Service Supplies Company, Philadelphia, Pa., spaces 200, 202, 204, 230, 232, 234. Automotoneers, destination signs, gear cases, high-tension truss pins, Keystone block signals, lamp guards, lightning arresters, mine and portable car telephones, overhead material,

pneumatic sanders and gong ringers, rail bonds and bonding tools, trolley catchers. Represented by Charles J. Mayer, A. H. Englund, J. W. Porter, Max A. Berg, J. V. E. Titus, G. W. Cox. H. G. Lewis, J. R. MacFarlin, E. R. Mason, W. A. Cockley, William A. Armstrong Jr., G. E. Watts, T. H. Henkle, O. Mueller, M. S. Earl, W. D. Hamer, C. D. Ewing, H. H. Johnson, N. P. Hall, F. H. Jamison, R. Montgomery.

Electric Traction, Chicago, Ill., space 9. Reception booth. Represented by H. E. Smith, W. J. Field, M. V. Fodge, H. E. Ross, H. L. Brown, H. J. Kenfield, H. L. Townsend, M. B. Marks.

Electric Traction Supply Company, St. Louis, Mo., space 615. New pilot fender for interurban cars, projecting fenders and wheelguards, automatic coupler, headlights, miscellaneous car equipment and line material. Represented by O. W. Uthoff, N. S. Brown, G. H. Cohn.

Emery Pneumatic Lubricator Company, The, St. Louis, Mo., spaces 104, 106. Pneumatic lubricators and pneumatic lubricant, brake cylinder lubricant. Represented by E. A. Emery, N. J. McAloney.

Esterline Company, Lafayette, Ind., space 228. Graphic meter, graphic speed recorder, Golden-Glow headlight. Represented by J. W. Esterline, George Bell, O. P. Smith.

Eureka Company, The, North East, Pa., space 241. Commutators, bearings, trolley wheels, trolley ears, controller parts, brush holders, come-alongs. Represented by C. Schimmelfeng, H. E. Norris, Fred Rundell, J. C. Howard, T. E. Lynn, J. S. Black, L. L. Fleig.

Falk Company, The, Milwaukee, Wis., spaces 352, 354. Switches, frogs and crossings. Represented by W. C. Burdick, C. L. Jones, F. G. Hibbard, H. S. Falk.

Flood & Conklin Company, Newark, N. J., space 11. Car sections and panels. Represented by L. A. Williams, H. J. Kuhn, L. H. Conklin.

Fonger Fender Company, Chicago, Ill., space 127. Car fender. Represented by William Fonger, Robert V. Fonger, Malcolm W. Fonger.

Ford & Johnson Company, Michigan City, Ind., space 607. Interurban seats in leather and plush, steel construction; trolley seats, stationary and reversible type, steel construction, in rattan; improved light-weight, stationary trolley seat in rattan; light-weight veneer seat, for trolley service; fiber rush chairs for interurban observation cars. Represented by B. H. Forsyth, C. A. Van Deveer, W. E. Murphy, J. R. Walters.

Forged Steel Wheel Company, Pittsburgh, Pa., space 347. Forged-steel wheels for electric railway service, forged-steel gear blanks. Represented by C. G. Bacon Jr., W. A. Libkeman, G. N. Boyd, R. L. Gordon, W. G. Cory, J. A. Rapp.

Forsyth Brothers Company, Chicago, Ill., spaces 29, 31. Metal doors, metal sash, pressed-steel "unit" sections for street car side construction. Represented by G. H. Forsyth, A. H. Sisson, W. M. Wampler, E. S. Taylor.

Galena-Signal Oil Company, Franklin, Pa., space 62. Reception booth. Represented by E. H. Baker, C. C. Steinbrenner, G. A. Barnes, E. V. Sedgwick, R. C. Smith, C. H. Thomas, L. R. Speare, Charles A. Record, W. A. Trubee, W. A. McWhorter, William Holmes, L. J. Drake Jr., C. E. Schauffler, W. J. Walsh, Robert McVicar, W. E. Amann, F. R. Stakelum, F. G. Beatty, R. H. Craig, J. C. Glair, Alfred Green, E. M. Hedley, W. H. Lee, W. A. Love, H. C. Mason, W. H. Pape, C. L. Richards, G. J. Smith, W. O. Stieff, J. E. Southwell, W. C. West.

Garton, W. R., Company, Chicago, Ill., space 426. Salamander (Heany) fireproof wire and coils, Electric Railway Equipment Company's line of overhead material and tubular steel poles, Bliss bears and pinions, armored, oil-treated and standard grade; Universal lead and Anti-Slip safety treads; general electric railway supplies. Represented by A. F. Henderson, Ray P. Lee, H. M. Kennedy, E. Lewis, O. M. Wells, A. W. Clapp.

General Electric Company, Schenectady, N. Y., spaces 51 to 60, Arena Building. New Sprague-General Electric type MK controllers, railway motors, both commutating-pole and self-ventilated; armorized solid gears and pinions; air-brake equipment including air compressors; SG straight air motorman's valve and SF-4 handle, EH-1 emergency, quick-service valve, sectionalized magnet valve, variable-release triple valve and motorman's valve, line material, 600-volt d. c. aluminum-cell lightning arrester for street cars, luminous-arc headlights, steam-flow meters, testing meters, indicating and recording meters, CP-28 portable air compressor, two types of ozonators, battery truck crane. Represented by J. G. Barry, A. K. Baylor, G. H. Hill, F. E. Case, C. E. Barry, E. H. Ginn, J. F. Layng, C. B. Keyes, H. N. Latey, J. H. Livsey, L. W. Shugg, W. J. Clark, E. P. Waller, H. L. Monroe, H. C. Marsh, W. G. Carey, W. A. Woolford, C. E. Eveleth, A. V. Thompson, V. E. Raggio, W. C. Campbell, George D. Rosenthal, J. C. Calisch, H. C. Glaze, C. E. Sprague, C. C. Peirce, R. E. Moore, W. B. Potter, S. W. Trawick, F. H. Gale, M. M. Corbin.

General Railway Signal Company, Rochester, N. Y., spaces 401, 403, 405, 407. Automatic block-signaling apparatus, typical section of automatic block signals controlled by continuous track circuit, a large circuit plan showing the operation and control of the apparatus, model 2-A semaphore signals, light signals, switch indicator with time-element device, model 2, form B relay, six-way model 2, form A relay, with check relay; frangible automatic stop, mechanical trip-stopping device. Represented by S. M. Day, R. C. Leake, H. M. Sperry.

General Vehicle Company, Long Island City, N. Y., space in aisle. Tower wagon, 2 tons capacity, property of Milwaukee Electric Railway & Light Company; industrial truck, 2000 lb. capacity. Represented by Edwin E. Witherby, W. J. MacDowell, T. W. Barnes.

Gilbert & Barker Manufacturing Company, Springfield, Mass., spaces 421, 423. Oil-storage systems for gasoline, kerosene and heavy lubricating and paint oils; hand and power-driven self-measuring pumps. Represented by C. F. Hatmaker.

Globe Ticket Company, Philadelphia, Pa., space 620. Street railway transfers, books and tickets of all descriptions, ticket punches. Represented by R. C. Osman, E. Elliott.

Gold Car Heating & Lighting Company, New York, N. Y., space 257. Electric heaters, ventilators, thermostats. Represented by W. H. Stocks, A. E. Robbins.

Goldschmidt Thermit Company, New York, N. Y., spaces 215, 217, 219, 221. Materials for welding rails, compromise joints, electric motor cases and truck frames by the Thermit process, samples of work done, samples of metal produced free from carbon by the Thermit process and a Goldschmidt Thermit Company rail grinder in operation. Represented by William C. Cuntz, F. W. Cohen, Felix Lange, H. S. Mann.

Green Engineering Company, Chicago, Ill., space 517. Photographs illustrating L type Green chain-grate stokers for coking coal, K type Green chain-grate stokers for free-burning coal, Geco pneumatic ash-handling systems, Geco pressure waterbacks, Geco air-banks, operating model of Green chain-grate stoker. Represented by Frank S. Spohr, Albert G. Burke Jr.

Griffin Wheel Company, Chicago, Ill., space 64. Car wheels for street railway and interurban service. Represented by C. K. Knickerbocker, G. D. Casgrain, W. A. Bennett, H. N. Scott, A. A. Hale, J. S. Ferguson, F. B. Flinn.

Grip Nut Company, Chicago, Ill., spaces 123, 125. Grip nuts, metal dust guards for journal boxes, monogram bolt locks and fastenings. Represented by E. R. Hibbard, J. W. Hibbard, W. E. Sharp, W. G. Wilcoxson, C. P. Marye.

Hale & Kilburn Company, spaces 49, 50. City, suburban and interurban railway car seats, steel interior car finish, moldings, doors, sash, etc.; hard-enameled canvas-lined rattan. Represented by V. Von Schlegell, A. F. Old, J. G. Bowen, J. K. Hoffman, I. Lubersky, F. Edson and H. Rotchester.

Harrison Safety Boiler Works, Philadelphia, Pa., space 253. Cochrane watering feed-water heater in operation; Cochrane multiport safety exhaust outlet valve for back pressure and vacuum service, Cochrane steam and oil separators. Represented by A. Sorge Jr., C. B. White, W. G. Tellin, W. S. Elder.

Hess-Bright Manufacturing Company, Philadelphia, Pa., space 243. Bearings now used, Jeffreys Manufacturing Company mine locomotive mounted on ball bearings, electro-dynamic stationary motor mounted on ball bearings, pair of interurban car wheels and axles mounted on Hess-Bright ball-bearing journal boxes, complete set

of Hess-Bright ball-bearing hangers, machine showing the difference in friction between plain and ball bearings. Represented by W. L. Batt, E. W. Rubencame.

Heywood Brothers & Wakefield Company, Wakefield, Mass., space 13. Car seats. Represented by Scot Wade, Bertram Berry, E. C. Lang.

Holland Trolley Supply Company, Cleveland, Ohio, space 263. Holland ball-bearing trolley bases, anti-friction pin plates, trolley harps, trolley wheels, air sander valves, sander traps, sander hoppers, mine harps and wheels, mine roof drill, pneumatic car fender, car ventilators. Represented by H. W. Cole, William Lintern.

Home Rubber Company, Trenton, N. J., space 614. N. B. O. sheet packing, N. B. O. steam hose, O. I. M. rod packing, water and steam hose. Represented by A. R. Foley, S. F. Denny, H. Stuart.

Hunter Illuminated Car Sign Company, Flushing, N. Y., space 629. Destination car signs. Represented by Lytle J. Hunter, Harry Reisiger.

Illinois Electric Railway Association, space 61. Reception booth; advertising literature of member companies; stenographer in attendance. Represented by Edwin C. Faber, A. J. Purinton, C. N. Wilcoxon, C. E. Flenner, H. E. Chubbuck, A. A. Anderson, M. E. Sampsell, B. I. Budd, J. R. Blackhal, W. C. Sparks, L. E. Gould, George Quackenbush, John Leisenring.

Indianapolis Brass Company, Indianapolis, Ind., space 69. Overhead-line material, line hardware, porcelain and composition insulation, reclaiming pole sleeves, ears, splicers, frogs and crossings, sleet cutters, section insulators, pole brackets, car equipment, motorman's mirrors, carbon and graphite motor brushes, lineman's and construction tools and supplies. Represented by James H. Drew, T. A. Lavelle, A. Hoover, T. U. Franklin, T. J. Jones.

International Register Company, Chicago, Ill. Spaces 502, 504, 506. International coin registers, International double and single fare registers, International rod-operating, cord-operating and foot-operating devices for ringing fare registers, car fittings, Heeren badges,

International conductors' ticket punches. Represented by Arthur H. Woodward, John Benham, William J. Volkins.

International Steel Tie Company, Cleveland, Ohio, space 131, 133. Insulated steel twin ties for paved street construction and for interurban railways, new sub-structure for railway crossings. Represented by William P. Day, J. J. O'Donnell, George Harpham, W. C. Mahon.

Jeandron, W. J., New York, N. Y., space 258. Le Carbone carbon brushes. Represented by W. J. Jeandron, Halsey Steins.

Johns, J. N., Manufacturing Company, New York, N. Y., space 129. Pivot journal bearings and wedges, unbreakable check plates, Flower brush holders for all types of motors, air-brake and controller handles, seamless steel bushings for air-brake handles, controller handles and stems, Col-R-Ol curtain hand strap renewer, upholstery, etc.; Rub-on varnish for inside and outside finishing, Rub-R-Tite electric car and auto top waterproofing. Represented by John N. Johns, Fred W. Roth.

Johns-Manville, H. W., Company, New York City, spaces 128, 130, 132, 134, 136. J-M fiber conduit for underground work; overhead trolley and transmission-line fittings; J-M Transite ebony asbestos wood and J-M Transit asbestos wood; "Noark" car fuse boxes and "Noark" N. E. C. S. protective devices, such as fuses, cutouts, service switches, etc.; trolley retrievers, trolley ears, lightning arresters, controlators and Audiffren-Singrun refrigerating machine. Represented by S. G. Meek, H. M. Frantz, H. W. Frantz, G. W. Saylor, H. M. Voorhees, A. Gove Newton.

Jones & Laughlin Steel Company, Pittsburgh, Pa., space 25. Cold-rolled steel axles, tested steel chain, track spikes, open-hearth and Bessemer steel, power transmission machinery, steel sheet piling, steel wire, barbed-wire fence, tinplate and black plate; steel wire nails, light rails and connections, structural steel, special and agricultural shapes. Represented by Roland Gerry, D. N Barker, George B. Mitchell, Frank S. Slocum, J. K. Barker.

Johnson Coin Counting Machine Company, New York, N. Y., spaces 518, 520. Coin-counting machines, registering fare boxes. Represented by C. H. Birdsall, W. P. Butler, J. M. Johnson.

Kennicott Company, Chicago Heights, Ill., space 425. Photographs of steel plate construction, including sprinkler cars, stacks, steel storage tanks, tank cars, etc., operating model water softener, operating model of filter, water weigher exhibit. Represented by Cassius L. Kennicott, Edwin J. Fleming, C. B. Blair, W. D. Hawkins, T. G. Windes Jr., William M. Jewell, F. S. Dunham.

Kerwin Machine Company, Detroit, Mich., space, South court. Kerwin-Detroit rail grinder in operation. Represented by James J. Kerwin, Ed. M. Greiner.

Keystone Lubricating Company, Philadelphia, Pa., space 610. Various densities of Keystone condensed oil for electric railway lubrication. Represented by W. E. Harrington, H. A. Buzby, F. Waldo Gordon.

Long, E. G., Company, New York, N. Y., space 612. Coil and elliptic springs for Peckham and other types of trucks. Represented by Edward H. Mays, Frank Van Anden.

Lorain Steel Company, Johnstown, Pa., spaces 301, 303, 305, 331, 333, 335. Manganese steel, switches, mates, frogs crossings, girder and high T-rails, electrically welded joints. Represented by P. M. Boyd, W. Milt. Brown, Carroll Burton, Staats J. Cotsworth, James E. Decker, E. B. Entwisle, H. C. Evans, H. L. Gleeson, William W. Kingston, H. F. A. Kleinschmidt, A. S. Littlefield, William Lynam, S. P. McGough, Edward Ott, Robert E. Paul, George W. Reese, H. C. Stiff, A. L. Verner.

Lyon Metallic Manufacturing Company, Aurora, Ill., spaces 222, 224. Lyon sheet steel gear cases, steel racks and shelving for storerooms, shops and buildings. Represented by F. S. Waters, B. L. Waters, John Worley Jr., Mr. Mitchell.

McCabe, J. J., New York, N. Y., spaces 236, 238, 240. Latest heavy pattern "2-in-1" double-spindle lathe with newly designed tool rest for wheel turning, also special wheel-holding attachment; lathe in operation turning car wheels and handling other repairs. Represented by Harry P. McCabe, Frank Sheeran, George L. Bennett, Walter Cantelo.

McCord Manufacturing Company, Chicago, space 211. Universal window fixtures, consisting of Universal flexible weather stripping, Universal metal weather stripping, Universal gravity wedging sash locks and racks, etc., two new types of locks, sash balances, deck sash ratchets, copper insulated adjustable sash, sash lifts, McCord Universal air hose protector, drawn metal moldings; 12 full sized working models. Represented by B. S. McClellan, A. W. L. Hartbauer, B. C. Wilt.

McGraw Publishing Company, New York, N. Y., spaces 2 to 10. Office and reception room; copies of Electric Railway Journal's convention souvenir number and four convention daily issues; Electric Railway Dictionary; Electric Railway Manual (Red Book); McGraw Electrical Directory, Electric Railway Edition; *Electrical World*, *Engineering Record* and *Metallurgical and Chemical Engineering*. Represented by James H. McGraw, Hugh M. Wilson, D. T. Pierce, Joseph A. Kucera, Henry W. Blake, L. E. Gould, F. Nicholas, Walter Jackson, F. Kingsley, Harold W. McGraw, George J. MacMurray, F. C. Wells, C. A. Babtiste, W. K. Beard, C. T. Walker, E. J. Hunt, P. T. Coburn, E. M. Haas, Clarence Henley, H. L. Fishacher, Miss Josephine Phelps, Miss E. Rice, Miss Marion McCrear.

McGuire-Cummings Manufacturing Company, Chicago, Ill., space, car exhibition track. Interurban combination car, passenger, smoker and baggage; 20-A trucks installed, high-speed MCB truck 70-A, MCB truck 10-B, Columbia single truck. Represented by J. J. Cummings, W. J. Cummings, C. T. Biddison, R. S. Noden, M. T. Kirschke Jr., J. T. Giblin, C. F. Propst, William Duga.

McQuay-Norris Manufacturing Company, St. Louis, Mo., space No. 603. "Leak-proof" piston head packing rings for compressors, pumps and engines of all types. Represented by W. K. Norris, E. H. Hill, H. G. Paro, C. R. Travis.

Massachusetts Chemical Company, Walpole, Mass., space 420. Insulating materials. Represented by L. O. Duclos, A. E. Duclos, E. W. Furbush.

Meyer Safety Guard Company, Omaha, Neb., space 500. Model of guard to prevent step accidents. Represented

by F. E. Alexander, Martin Meyer, W. D. Kyle, R. N. Burgess, H. T. Holden.

Mica Insulator Company, New York, N. Y., space 247. A complete line of insulation for the armature winder and commutator builder, including the following brands: Micanite, Empire, Kablack, Linolac, Mico and M. I. C. compound. Represented by Charles E. Coleman, Charles H. Bell, August F. Tinnerholm.

Midvale Steel Company, Philadelphia, Pa., spaces 356, 358. Rolled-steel wheel (one-wear), pony truck wheel, rolled steel wheel, motor truck axle and armature shaft, rolled-steel wheels mounted on axle, rolled-steel gear blank. Represented by H. M. Deemer, D. V. Foster, C. F. Tietze, J. R. Holcomb, G. Aertson, Ernest Harrah, W. S. Edger, Morgan D. Hayes, Thomas Price, Stuart Hazlewood, H. C. Johnstone, Lloyd R. Wells, C. W. Sager, T. W. Illingworth, J. Bradley Patterson.

Monarch Brake Company, Cumberland, Md., space 605. Worm-geared hand brake. Represented by Henry Fresh.

Nachod Signal Company, Philadelphia, Pa., space 430. Operative automatic signals for electric railways connected to track plans, type MD for single-track facing protection, Type HD for double-track rear protection, highway crossing signal, relays, trolley contactors. Represented by C. P. Nachod, F. W. Kulicke, H. R. Stadelman.

National Brake Company, Buffalo, N. Y., space 226. Peacock and Ackley adjustable brakes, improved Peacock brake. Represented by Frank D. Miller, W. D. Brewster, Thomas C. Boyce.

National Brake & Electric Company, Milwaukee, Wis., spaces 17, 19, 21, 619. National straight air brakes, stationary motor and belt-driven air compressors, portable motor-driven air compressor outfits, type "3VS" and "3VD" stationary motor-driven air compressors, portable gasoline-driven air compressor outfit, National air governors, motorman's valves and other air brake apparatus. Represented by R. P. Tell, C. N. Leet, W. D. Glenn, B. S. Aikman, J. J. Nef, W. H. Beattys, Jr., W. N. Bisel, C. P. Billings, George C. Anthon, G. W. Johnston, W. J. Richards, W. K. Boyle, J. E. Huebel.

National Carbon Company, Cleveland, Ohio, space 15. Street railway motor brushes, stationary motor and generator brushes under the following brands: Laclede, Columbia, Partridge, Graphoid. Represented by F. D. Kathe, O. T. Weaver, E. H. Martindale.

National Malleable Castings Company, Chicago, Ill., spaces 621, 623. Radial car couplers, oil boxes, track equipment material. Represented by E. H. Schmidt, J. W. Stephenson, C. S. Johnston, J. J. Byers, H. I. Hiatt.

National Lead Company, New York, N. Y., space 628. White lead, red lead, babbitts and solder. Represented by E. A. DeCampi, William A. Dail, J. B. Mendenhall.

National Lock Washer Company, Newark, N. J., space 515. Lock washers, car curtains, curtain fixtures, sash locks, sash balances, anti-sash rattlers. Represented by John B. Seymour, Charles P. Williams, H. J. McGinn, F. B. Archibald.

National Surety Company, New York, space 114. Advertising literature. Represented by Clinton W. Raynor, Arthur W. Rankin.

National Tube Company, Pittsburgh, Pa., spaces 313 to 323. Shelby overhead trolley-pole-testing machine, National tubular street poles, National and Shelby boiler tubes, Kewanee unions and specialties, N. T. C. regrinding valves, N. T. C. malleable and cast iron fittings. Represented by L. F. Hamilton, B. F. Jones, B. F. Bart, A. N. Hobart, L. R. Phillips.

Near-Side Car Company, Philadelphia, Pa., space, exhibition car track. Single truck "Near-Side" car, double truck "Near-Side" car. Represented by Thomas Penney, H. N. Ransom, P. J. Mitten, John Sherman.

Newman Clock Company, space 256.

Newtone System, Chicago, Ill., space 121. Glazene leather and curtain finish and Newtone car finish. Represented by R. B. Kadish, H. E. Newton.

Northey-Plummer, Ltd., Indianapolis, Ind., spaces 429, 431. Simmen system of railway signaling in operation, including full-size equipment and automatic train stop. Represented by J. P. Northey, T. H. Plummer, P. J. Simmen, C. E. Chatfield, J. P. May, E. Moore, P. R. Young.

Nuttall, R. D., Company, Pittsburgh, Pa., spaces 47, 48. Electric railway and industrial gears, pinions, trolleys and couplings. Represented by F. A. Estep, Milton Rupert, W. H. Thompson, F. M. Erb.

Ohio Brass Company, Mansfield Ohio, spaces 201, 203, 233, 235. Overhead trolley supplies, catenary supplies, rail bonds including new type for ball of rail, third-rail insulators, National railroad trolley guard, O-B Hi-Tension porcelain insulators, Tomlinson automatic car couplers with air and electrical connecting features, Tomlinson M. C. B. couplers, trolley retrievers and catchers, trolley harps and wheels, trolley bases, air sanders. Represented by A. L. Wilkinson, E. F. Wickwire, A. B. Edes, A. L. Price, C. T. Anderson, C. E. Young, J. R. Brown, N. M. Garland, J. E. Slimp, F. A. Strail, Nathan Shute, F. E. Johnson, C. A. Veatch, F. V. Cook, R. J. Deneen, E. C. Brown, G. A. Kroener, W. H. Bloss.

Ohmer Fare Register Company, Dayton, Ohio, spaces 501, 503, 505. Universal fare-recording and printing register, cash totalizing register for city properties, recording and printing fare box, improved rapid transit operating device for prepayment cars, improved turnstile register combination, full line of recording and printing registers for recording from two to sixty different classifications of fares. Represented by John F. Ohmer, J. H. Stedman, H. Beckman Ohmer, C. V. Funk, C. W. Ketteman, P. F. Buckley, Edward Seebers, C. S. Bidwell, Walter Nelson, Ray Lafferty, C. O. Trine.

Pantasote Company, New York, N. Y., spaces 508, 510, 512. Agasote car outside roof, Agasote car hood, Agasote car headlining, Pantasote upholstery and curtain materials. Represented by John M. High, William A. Lake, Allan S. Barrows.

Pellissier Engineering Company, Springfield, Mass., space 601. Pellissier rail grinder. Represented by L. D. Pellissier, G. E. Pellissier.

Pennsylvania Steel Company, The, Steelton, Pa., spaces 300, 302, 304, 306, 328, 330, 332, 334. Solid "Manard" switches, mates and frogs; ironbound switches, mates and frogs, with "Manard" centers; "Pinless" and "Hook Heel" switches, switch stands and "Mayari" steel specimens. Represented by John C. Jay Jr., R. W. Read, R. W. Gillespie, C. S. Clark, N. E. Salsich, R. C. Hoffman Jr., J. G. Miller, K. C. Banks, R. E. Belknap, J. Drew Allen, J. F. Hennessey, G. K. Reel, H. B. Cooney, G. W. Parsons, G. S. Vickery, W. M. Henderson, C. A. Langdon, C. A. Alden, H. M. Garverich, W. W. Philler, F. H. Ogden.

Pollak Steel Company, Cincinnati, Ohio, space 32. Heat-treated motor, railroad car locomotive axles and locomotive forgings, including crankpins and piston rods. Represented by J. A. Pollak, H. S. Buck, F. W. Graves.

Prepayment Car Sales Company, New York, N. Y., spaces 529, 531 and car exhibition track. Double-deck stepless prepayment car, exhibited by courtesy of the New York Railways Company. Represented by T. W. Casey, A. H. Englund, Harold Rowntree, W. A. Cockley.

Pyrene Manufacturing Company, New York, space 259. Fire extinguishers. Represented by E. M. Davidson R. C. Iddings, G. C. Breidert.

Rail Joint Company, New York, N. Y., spaces 81, 82. Continuous rail joints, high T-joint, girder joints, insulated joints, compromise or step joints, frog and switch joints, Weber rail joints, high T-joints, girder joints, insulated joints. Represented by T. F. Braine, V. C. Armstrong, W. E. Clark, E. A. Condit Jr., W. A. Chapman, F. C. Webb, H. O. Holloway, W. S. Boyce.

Railway Improvement Company, spaces 522, 524. Anti-climbers, coasting recorders, sanitary straps. Represented by Andrew J. Pizzini, William Ogden Wade, Harry F. Keegan, E. B. McKinney.

Railway Roller Bearing Company, Syracuse, N. Y., spaces 237, 239. G. E. 216 railway motor with Rollway bearings which have been operated eleven months, Rollway journal boxes and bearings which have operated nearly three years, high-speed induction motor with Rollway bearings which have operated two years; new Rollway journal boxes and bearings for Baldwin-Westinghouse electric locomotive, Rollway journal boxes for Brill trucks, Rollway journal boxes for storage battery cars of both New York Railways and Third Avenue Railway type, Rollway car wheel with bearings complete mounted on a fixed axle, Rollway center plates and vari-

ous disassembled parts of different types of bearings. Represented by James N. Vandegrift, H. L. Aberdeen.

Railway Supply and Curtain Company, Chicago, Ill., space 124. Car window curtains, sliding-door curtains, deck sash openers, door checks, coin wrappers. Represented by Plato G. Emery, C. W. Braithwaite.

Railway Track-Work Company, Philadelphia, Pa., space 212. Reciprocating track grinder in operation. Represented by William D. Gherky, A. M. Nardini, William B. Goodall.

Railway Utility Company, Chicago, Ill., space 119. Utility car ventilators, Utility electric thermostats, Utility electric vacuum car cleaners, Utility high pressure steam or air couplings. Represented by William J. Pine, Lee P. Hynes.

Rand, McNally & Company, Chicago, space 7. Commercial atlas, library atlas, time-folder and pamphlet racks, ticket cases, globes, cabinet with maps for mercantile routing, map (8 miles to the inch) showing all electric railways in the United States in red. Represented by J. J. Carr, R. R. Steele, C. O. Lindgren.

Recording Register & Fare Box Company, New Haven, Conn., space 613. Fare box, fare registers. Represented by Frank B. Kennedy, M. DeForest Yates.

Roebling's Sons, John A., Company, Trenton, N. J., spaces 514, 516. Bare wire, trolley wire, wire rope and fittings, insulated wires and cables, car wire and cables, motor leads. Represented by A. B. Conover, G. W. Swan, W. J. Slingluff, A. V. Errickson, J. R. Summerfelt, F. W. Warner, A. L. Seaman and H. O. Cauldwell.

Rooke Automatic Register Company, Providence, R. I., space 617. Rooke automatic fare registers. Represented by George F. Rooke, Jilson J. Coleman.

Root Spring Scraper Company, Kalamazoo, Mich., space 255. No. 2, No. 3 and No. 5 special spring scrapers, all mounted on exhibit stand and operated by air. Represented by Fred N. Root, Nathan Root.

Richard Russell, Toronto, Canada, space 263. The trigger-lock reversible controller finger. Represented by Richard Russell.

St. Louis Car Company, St. Louis, Mo., space 530. Cars, trucks and specialties. Represented by John I. Beggs, E. B. Meissner, Nic LeGrand, G. L. Kippenberger, W. L. Alt, C. R. Beers, Gus Koch, Walter S. Miller, J. C. Wallerstadt, Karl Schliepman.

Schutte & Koerting Company, space 225. Schutte valves and Koerting jet apparatus, stop check and emergency valves, extra-heavy hard bronze valves, Schutte Precision gate valves, Standard Koerting injectors, syphons, educators, air exhausters and jet condensers, Koerting fuel burners. Represented by J. P. Dunlap, J. J. Gesseleman.

Scientific Railway Appliance Company, Chicago, Ill., space 603-A. Automatic safety devices for electric railway cars. Represented by Oscar Johnson and two assistants.

Simmons-Boardman Publishing Company, New York, N. Y., spaces 3, 5. Copies of the *Signal Engineer, Railway Age Gazette*, the "Signal Dictionary," and other books. Represented by L. Sherman, H. H. Simmons, Samuel O. Dunn, John N. Reynolds, E. T. Howson, H. F. Lane, R. E. Thayer.

Smith, Peter, Heater Company, Detroit, Mich., space 65. Coal-burning and electric forced ventilation hot air heaters. Represented by Daniel W. Smith, E. J. Smith, W. E. Hinmon, W. M. McKee, M. J. Phelan, H. W. Busch, H. S. Williams.

Speer Carbon Company, St. Marys, Pa., space 608. Carbon brushes, generator brushes, motor brushes, slip-ring brushes, carbon contacts, carbon electrodes and carbon specialties. Represented by J. S. Speer, J. C. Lion.

Spencer Otis Company, Chicago, Ill., Space 220. Tie plates for screw spikes and for girder and high T-rails, tie plates for common square spikes, automatic springless dial scales. Represented by Carter Blatchford, W. L. DeRemer, H. H. Hart, A. L. Hammond, L. D. Rockwell, W. D. Thompson, A. J. Odegaard.

Standard Coupler Company, New York, N. Y., space 262. Shim slack adjuster for taking up wear on brakeshoes. Represented by George A. Post, Jr., Wilberforce Eckels, W. H. Sauvage, E. H. Walker.

Standard Motor Truck Company, Pittsburgh, Pa., spaces 337, 339, 341, 343, 345. Six motor trucks, comprising trunk line service heavy equipment C-80-P, double truck; Interborough C-60, double truck; Boston Elevated special C-55, double truck; inside-hung motor pressed frame city and suburban MC-50-P; short wheel-base outside-hung motor, city and suburban, double truck C-50 type, and MO-36 single motor maximum-traction double truck. Represented by A. W. Field, W. A. Libkerman, W. G. Price, G. Boyd, P. Wendt, R. Hamerstrow, A. Christiansen, R. L. Gordon, W. G. Cory.

Standard Paint Company, New York, N. Y., space 509. P. & B. and S. P. C. insulating varnishes, insulating compounds, insulating tape, Impervite cement floor finishes, Impervite waterproofing material. Represented by John Thomas, Charles E. Smith, Harry A. Inwood.

Standard Roller Bearing Company, Philadelphia, Pa., space 229. Standard journal roller bearings. Represented by J. G. Cooley.

Standard Steel Works Company, Philadelphia, Pa. Wheels, tires, axles, springs, forged-steel gear blanks, including new wheels, process of manufacture of rolled wheels, tires and gear blanks, together with wheels which have been worn out in service. Represented by Charles Riddell, C. H. Peterson, C. F. Dodson, W. H. Bentley, F. W. Weston, William F. Boyer, P. G. Cheatham, H. P. Knight, P. C. Morrow, C. G. Rank, G. H. Goodell, A. R. Green, H. G. Pearce, W. H. Pugh Jr.

Standard Underground Cable Company, Pittsburgh, Pa., space 600. Lead-covered and armored power cable, bare and insulated wires, Colonial copper-clad wire, trolley wire, Davis open-air and station terminals, manhole junction boxes, cable-jointing materials. Represented by J. R. Wiley, C. J. Marsh, A. A. Anderson, J. H. Lytle, E. J. Pietzeker.

Star Brass Works, Kalamazoo, Mich., space 611. Trolley wheels and harps. Represented by O. P. Johnson.

Sterling Varnish Company, space 415. Insulating varnishes, Sterling iron enamel paints. Represented by A. S. King, W. V. Whitfield.

Stewart Hartshorn Company, East Newark, N. J., space 626. Curtain rollers, sash balances, vestibule rollers, etc. Represented by B. E. Bushnell.

Taylor Electric Truck Company, Troy, N. Y., spaces 346, 348, 350. Eight-foot wheelbase Taylor extra-heavy single truck, M. C. B. triple-spring truck, heavy long-base double truck, twelve T. M. C. sleet-truck wheels. Represented by John Taylor, Walter E. Taylor, C. H. Dodge.

Templeton, Kenly & Company, Ltd., Chicago, Ill., space 216. Simplex car, track, coach and bridge jacks. Represented by Alfred E. Barron, J. H. Hummel, Arthur C. Lewis, W. J. Miskella, W. R. Templeton, E. A. Wales.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, space 34. New gears and pinions, worn gears and pinions with exceptional mileage records. Represented by C. E. Sawtelle, E. S. Sawtelle, Leroy Brooks Jr., L. A. Tegler.

Transportation Utilities Company, New York, N. Y., space 68. Car specialties, diaphragms, vestibule curtains, car-window curtains and fixtures, steel floor plates, flexolith composition flooring, trap dors, window fittings, resisto insulation, steel doors, etc. Represented by C. R. Jamison, W. S. Humes, Thomas Dunbar Jr., W. L. Conwell.

Trolley Supply Company, Canton, Ohio, space 210. Knutson retriever No. 5 and No. 2, Ideal catcher, Peerless roller-bearing trolley base No. 10, Star roller-bearing trolley base, new type trolley base, roller-bearing; Peerless check valve, pressed-steel dash headlights No. 14 and No. 15, Peerless junior headlight, plain arc and combination arc and incandescent. Represented by J. E. McLain, Joseph Hollis.

Under-Feed Stoker Company of America, Chicago, Ill., space 112. Jones under-feed stoker. Represented by F. M. Smith, David Hunter Jr., Charles S. Crowell, R. H. Post, Alfred Lotz.

Union Switch & Signal Company, Swissvale, Pa., spaces 400 to 412. Working models of interurban signaling systems, semaphore signals, light signals, relays, switch boxes, Keystone insulated rail joints, lightning arresters, transformers, switch indicators and impedance bonds for automatic track circuit signaling, staff system instruments. Represented by H. W. Griffin, H. McCready, F. J. Ackerman, S. E. Gillespie, C. R. Bell.

United States Electric Signal Company, West Newton, Mass., spaces 415, 417, 419. Automatic block signals, automatic car-counting signals, automatic spacing signals, automatic track circuit signals for interurban railways, automatic crossing alarms. Represented by Roland F. Gammons, John J. Ruddick, Robert S. Bowen, Ralph Mosher.

U. S. Metal & Manufacturing Company, New York, N. Y., space 36. Reception booth. Represented by B. A. Hegeman Jr., Charles C. Castle, H. A. Hegeman, J. J. Ross, H. K. Porter.

Universal Lubricating Company, Cleveland, Ohio, space 622. Tulc lubricant in different grades. Represented by C. B. Emery, S. W. Schofield.

Universal Safety Tread Company, Boston, Mass., space 428. Universal safety treads, Anti-Slip metal treads. Represented by F. W. Langford, George S. Montgomery.

Valentine & Company, New York, space 209. Valentine's systems of wood and steel car painting, Valspar varnish. Represented by L. B. Valentine, I. H. Munford, J. E. Ham, C. W. Rhoades.

Van Dorn, W. T., Company, Chicago, Ill., space 265. Twenty-five types and designs of Van Dorn automatic couplers, part with draft gear; dummy knuckle, big ball joint. Represented by W. T. Van Dorn, H. E. Van Dorn, W. E. Van Dorn, John Sjoquist, Charles Johnson.

Vixen Tool Company, Philadelphia, Pa., space 261. Demonstration of Vixen files on lathe work and file tests conducted on the Herbert file-testing machine, Vixen rail planers. Represented by H. Rawcliffe, E. H. Wachs, Jr.

Waclark Wire Company, New York, N. Y., spaces 604, 606. Different sizes and kinds of copper wire and material showing the entire process of manufacture from the copper wire bar to the finest size wire. Represented by F. W. Wallace, W. A. Brown, Charles P. Lyman, E. L. Goldschmidt.

Walinger Company, The, space 100. Photography. Represented by Charles Walinger, W. A. Graber.

Wallace Supply Company, Chicago, Ill., space 507. Car fittings, door fixures, trolley cord, angle benders, eye benders, ring benders, etc. Represented by Wesley Meeteer, Carl Metterhausen.

Ward Equipment Company, New York, N. Y., space 139. Ward's improved passenger car ventilator, special ventilator for electric railway cars. Represented by A. L. Whipple, E. C. Post.

Western Automatic Fender Company, Seattle, Wash., space 207. Air-controlled safety fender. Represented by J. W. Lysons, F. A. Nelson.

Western Electric Company, New York, N. Y., spaces 414, 416. Complete line of overhead material, Shelby trolley poles, Electrene fire extinguishers, electric car heaters, Western Electric Sturtevant vacuum cleaners, linemen's tools, brakes, sandboxes, fare registers and complete line of car equipment material, inter-phones for interior telephone service, train-dispatching telephones including way station apparatus, dispatchers' apparatus and portable telephones. Represented by M. A. Oberlander, H. L. Grant, F. D. Killion, R. H. Harper, J. H. Davies, D. C. Guest, C. E. Robinson, I. A. Shively.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., spaces A-B, 37, 46. One of the 1200-volt d. c. Southern Pacific locomotives, one of the 11000-volt New York, New Haven & Hartford locomotives, field control motors, type HL unit switch control equipments for 600 volts and control equipments and motors for 1200 volts in operation. Represented by Calvert Townley, C. S. Cook, M. B. Lambert, J. C. McQuiston, H. W. Cope, W. W. Briggs, S. J. Keese, F. H. Shepard, J. J. Sinclair, J. A. Brett, G. S. Vail, W. H. Swift, H. A. Cole, George Ewing, J. J. Gibson, Thomas Cooper, E. P. Dillon, J. G. Miles, H. A. Faber, C. G. Schluederberg, S. D. Levings, T. C. Eayrs, J. P. Alexander, H. C. Stier, R. H. Smith, D. L. Keiser, B. G. Lamme, N. W. Storer, G. M. Eaton, R. E. Hellmund, C. Renshaw, L. E. Schumacher, W. Schaake, G. H. Holy, L. J. Kirby, R. L. Wilson, F. W. Harrison, J. R. Ellicott, C. R. Ellicott, W. G. Kaylor.

Westinghouse Machine Company, Pittsburgh, Pa., spaces A-B, 37, 46. Direct-current turbo-generator. Represented by E. H. Sniffin, H. A. Rapelye, Howell Van Blarcom, L. L. Brinsmade, Barton Stevenson.

Wharton, William, Jr., & Company, Philadelphia, Pa., spaces 336, 340, 342, 344. Solid manganese steel switches for steam and electric railways, solid manganese girder mate and frog, manganese center switch, mate and frog, girder; insert manganese T-rail switch, mate and frog; solid manganese T-rail switch, mate and frog; guard rails and clamps; frogs for underground conduit construction, manganese center and solid manganese crossings, manganese tipped switch points, spring boxes, ground throws, concealed; models, large photographs. Represented by Victor Angerer, L. R. Ashhurst Jr., R. C. McCloy, George R. Lyman, H. F. McDermott, W. McLain, Arthur S. Partridge, C. F. Bulotti.

Wheel Truing Brake Shoe Company, Detroit, Mich., space 24. All kinds of abrasive brake shoes. Represented by J. M. Griffin, F. F. Griffin.

Whitmore Manufacturing Company, Cleveland, Ohio, space 63. Gear and pinion from Schenectady Railway Company, pinion from Oneida Railway Company, gear from Syracuse Rapid Transit Railway Company, gear and pinion from Chicago Railways Company, gear and pinion from Spokane & Inland Empire System, four pinions, Cleveland, Painesville & Eastern Railroad Company. Represented by S. W. Whitmore, William Beaser Jr., R. R. Hertzog, W. M. Lawyer, Henry Stuckenholt.

Whittier Mills Company, Chattahoochee, Ga., space 242, "Spiral" waterproof cord for trolley and arc lamps, mahogany and drab bell cord. Represented by G. H. Thomas.

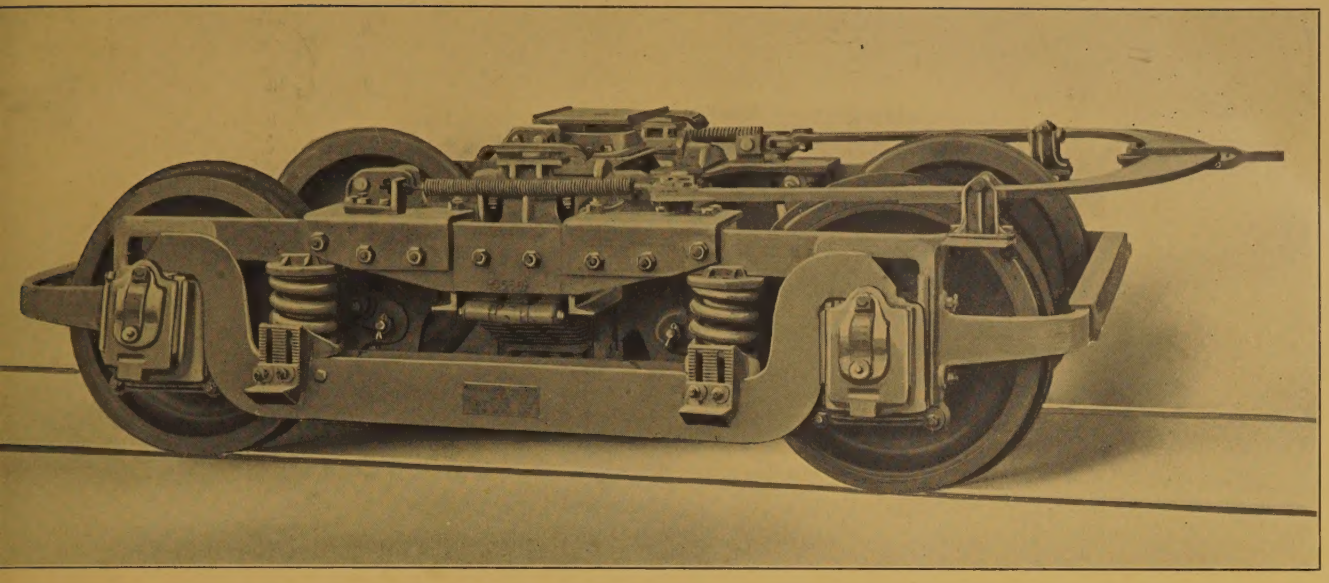
Wilson Remover Company, New York, N. Y., space 637. Paint and varnish removing by compressed-air spraying and vacuum cleaning. Represented by John MacNaull Wilson, James Whitney Wilson.

Wood, Charles N., Company, Boston, Mass., space 413. Chapman automatic signal for electric railways. Represented by Charles N. Wood, W. M. Chapman.

Yale & Towne Manufacturing Company, New York, N. Y., space 213. Hand and electric hoists, trolleys and triplex trolley hoists. Represented by R. T. Hodgkins, W. A. Hall, R. J. Kleinsmid, H. R. Butler.

Yawman & Erie Manufacturing Company, Rochester, N. Y., space 136. Record safe for filing cabinets, efficiency office desk, sectional filing cabinets in full and half widths, upright filing cabinets, blueprint cabinets, desk trays and filing systems. Represented by Roland Cole, A. E. Eggert.

The Pennsylvania Steel Company, Steelton, Pa., and the Maryland Steel Company, Sparrow's Point, Md., have a combined elaborate exhibit of track and special work in the hall devoted to track and track appliances in the west end of the Amphitheater. The exhibit is notable for its completeness as well as for the number of new specialties which the company is showing. Among the latter are samples of Mayari steel, which is made only by the Pennsylvania and Maryland steel companies, from a low-phosphorus Cuban ore containing the valuable alloying elements nickel and chromium. Mayari steel is claimed to have a higher tensile strength and elastic limit than a carbon steel of the same carbon content and to be especially adapted to use wherever a strong, tough steel is needed, with high shock-resisting powers, combined with resistance to fatigue and alternately applied stresses. The company recommends for frog and crossing work heat-treated Mayari steel bolts (natural alloy nickel chromium steel), with an elastic limit not less than 75,000 lb. and ultimate strength not less than 100,000 lb. per square inch and capable of being bent cold without fracture. There is also on exhibit a full line of Manard specialty work, including some new designs, notably hard-center frog No. 169. This type of frog provides Manard surfaces for all parts subjected to double wear. The Manard tailpiece is integral with the wing blocks and the point, which are connected by transverse braces, and the base of the casting forms a plate level with the bottom of the rails. The entire Manard casting is of practically uniform cross-section throughout. For the convenience of the delegates the Pennsylvania Steel Company and the Maryland Steel Company have prepared a sort of a description in pamphlet form of the exhibits shown in its space.



borne by a set of helical springs over the journal boxes that finally equalize the entire load and produce the easiest riding pivotal truck having equal-sized wheels that can be built for city and suburban service—the high potential in spring systems.

¶ The Brill No. 39-E truck for city service is peculiarly adapted to its field by virtue of the diversified conditions under which it may be used. The use of a single motor properly placed permits a great reduction in weight and the bolster arrangement throws, on the average, seventy per cent of the load on the driver and reduces the necessary radius of curvature to a minimum. The car body may be lowered to a considerable degree, thereby reducing step heights and it may also be very much narrower. All this permits the use of lighter underframing. In consequence hereof, more rapid acceleration, long life, a marked reduction in current consumption and greatly reduced maintenance charges are direct results—the high potential in single motor truck construction.

¶ The Radiax truck is the result of years of experimenting with the radial axle principle. Its form of construction, with its long wheel base, permits the use of longer car bodies than the usual single truck. In producing in a single frame a radial axle truck that really radiates on curves and really relocates itself on tangents with real spring stability, the highest development of this form of truck has been achieved. It makes possible the use of a long wheel-base in proportion to the shortest radius curves for which it may be designed and the traversing of average curves at high speeds. The patented frame suspension from floating journal boxes has shown itself, both in theory and practice, to be correct. Economy, resulting from light weight, versatility of service, low current consumption, low maintenance and little wear on wheel or track makes this the high potential in radial axle truck design.

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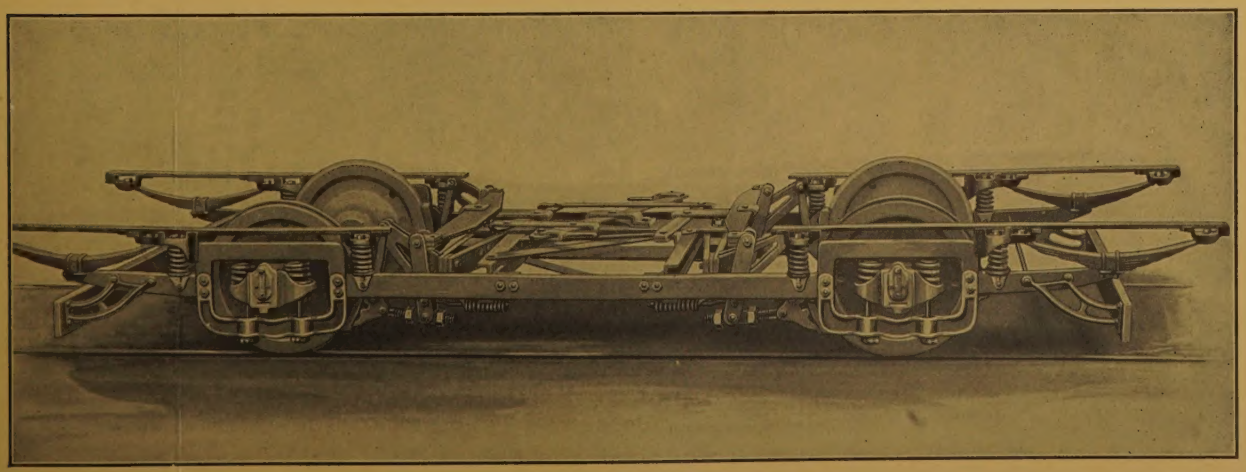

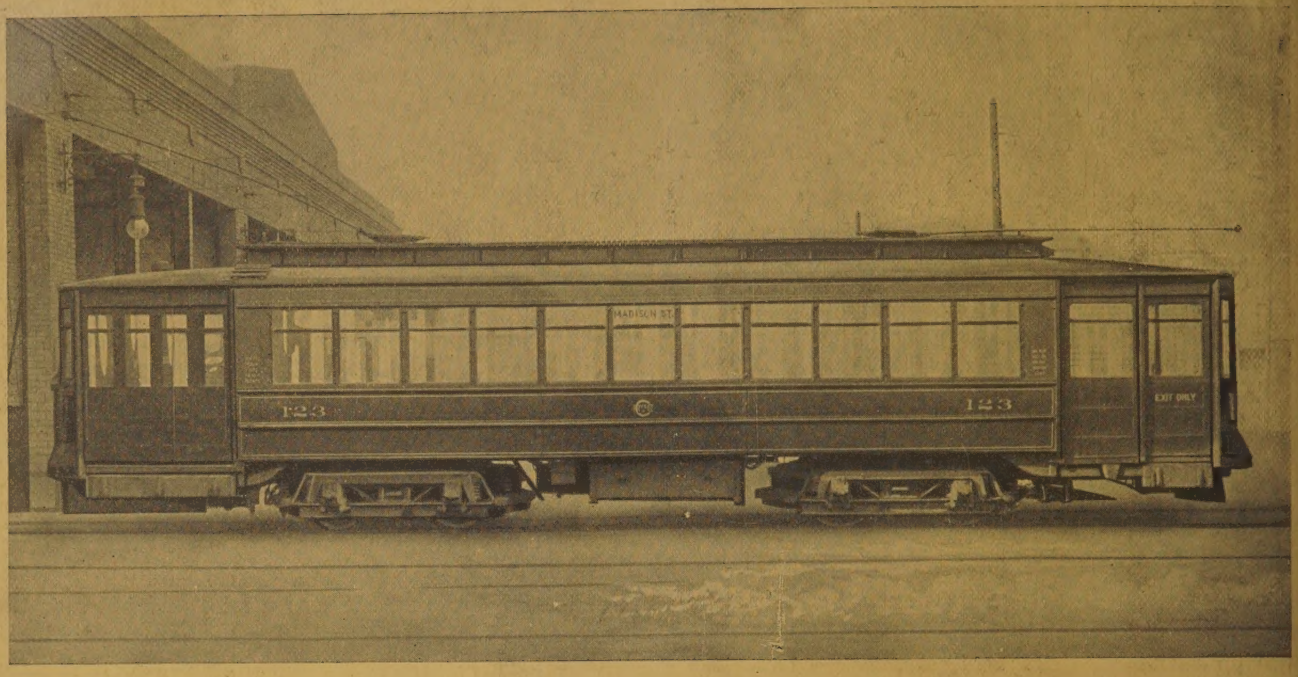

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